"The long term implications for the future of Dental Anaesthetic Practice following the General Dental Council's Guidelines of November 1998."

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2006

I, Iain M Middlemass, declare that the following Dissertation has been entirely my own work.

Signed:

Date: 21st August 2006

Boundary Changes In Lincolnshire

It is considered apposite to mention here the situation regarding the entities of Lincolnshire and South Humberside. Before 1974 and post 1974 both entities were part of one county, namely Lincolnshire. These changes in county boundaries were made throughout the United Kingdom by the government of the day. In the case of Lincolnshire in the period following 1974 and prior to 2000 the northern area of the county was "hived off" and given the title of South Humberside. However, in the period after 2002 this area of South Humberside was returned to the county of Lincolnshire due to further administrative changes. The references to both areas for the sake of the study actually refer to Lincolnshire county as a whole entity and it was felt reasonable to combine the results of the two former areas. This is particularly important as it might otherwise have been felt that a comparison of results was being made between the two areas and for the purposes of the study no distinction is made between those areas and the GDP's concerned.

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Abstract

"The long term implications for the future of Dental Anaesthetic Practice in Lincolnshire following the General Dental Council's Guidelines of November 1998."

The subject of this thesis is based on the continuing requirements of patients for dental anaesthesia following the revised General Dental Council (GDC) Guidelines of November 1998.

The factors to be considered in particular are issues which directly apply to referred patients for a dental general anaesthetic (DGA) namely – social class, gender, ethnicity, occupation, background education, attitude towards dental treatment and pre-operative medical history. In addition to considering the issues involved in assessing the suitability of patients for a general anaesthetic (GA) attention will be paid to the General Dental Practitioners (GDP) rationale for referring a patient for GA and whether the choice of such treatment was in any way influenced by the mindset of the patient. Issues relating to case selection will be taken into account along with the steps taken to avoid a repeat anaesthetic. The factors which motivate a GDP to offer GA, sedation or LA will be examined along with the possible reasons which guided the patient to make that decision. A look to the future will be undertaken with regard to GA and sedation services in the UK subsequent to the November 1998 guidelines with some emphasis placed on the adult use of such services.

In order to assess the implications and effects of the GDC guidelines on GA services, a study of the attitudes and opinions of both referring and treating dentists was undertaken. This study also took into account the views and attitudes of patients both pre- and post-assessment.

The methodology used was both qualitative and quantitative in nature involving the use of questionnaires; two questionnaires were sent to the referring and clinical dentist. The purpose of the questionnaire to the clinical dentists was to determine referral patterns post-guidelines and to monitor compliance with these, whilst the questionnaire to the treating dentists was designed to monitor attitudes regarding referrals for treatment. Likewise patients were given two questionnaires to determine whether patients referred for GA, sedation or LA were satisfied with the treatment plan and subsequent outcome.

Since the Poswillo Report of 1990 there have been general recommendations to move from the position of GA towards sedation. Correspondingly part of the referring dentists questionnaire contained a section on this aspect of patient care.

The results of the study are considered in detail and inferences drawn relating to the present and future provision of both GA and sedation in the UK.

Chapter I

INTRODUCTION

Dolore Vincto Timore Victo ***"Abolish Pain to conquer Fear"*** **(adapted from the motto of the Society for the Advancement of Anaesthesia in Dentistry")**

It has been said on numerous occasions that fear stalks the dental surgery (Trieger1988) – this fear being universal. The dentist frequently deals with phobic patients many of whom avoid routine dental treatment and only appear when suffering from pain, sepsis or trauma. Looking back 150 years one can only imagine the misery and suffering prior to the development of modern dental techniques and in particular the advent of dental general anaesthesia (DGA). The word anaesthesia itself stems from the Greek *"an"* meaning negative and *"aisthasis"* indicating complete absence of all sensation (Sykes 1981).

At the present time the state of anaesthesia may be defined as

> "*the absence of sensation artificially induced by the administration of gases, the injection of drugs or a combination of both*" (Welbury 1997).

GA therefore implies a complete loss of consciousness and is a method of management which has been available to the dental profession since Horace Wells discovered the anaesthetic properties of nitrous oxide in 1844 and Morton gave his seminal demonstration of inhalation ether anaesthesia at the Massachusetts General Hospital on 16 October 1846 (Thomas 2003).

In the years to follow, a single anaesthetic agent namely chloroform or ether, was used to induce a state of unconsciousness where surgery involved GA. The three components of GA were utilised, namely analgesia, narcosis and muscular relaxation. As paralysing drugs had not yet been discovered, the necessary muscular relaxation was attained only at deeper and sometimes very deep levels of anaesthesia. It was often the case that the use of the three components making up a GA were sometimes greatly in excess of the requirement of the operation, patients frequently taking a considerable time to regain consciousness and suffering correspondingly from distressing side effects, eg post operative vomiting. GA in dentistry was considerably improved with the introduction of nitrous oxide during the first world war. (Carrie et al 1996). In 1934 thiopentone became the norm for intravenous induction in DGA. As this particular drug could cause serious side effects in inexperienced hands, its use was replaced by halothane in 1956 and brietal in 1957, which considerably enhanced out patient DGA. Halothane, however, had a propensity to cause cardiac arrythiamias (Worthington et al 1998) and was replaced by Sevofluorane in the early 1990's. In 1986 Propofol was developed for clinical use in the UK. Propofol is a non-barbiturate agent which acts rapidly, and is said to be the safest induction agent so far.

Early anaesthesia was developed in the era before the sterilisation of instruments, and it could be said that bacterial infections were to remain the main antagonists once an understanding of pain control was developed (Thomas 2003). The development of

the dental and anaesthetic professions was achieved by the Dentists Act 1921 which controlled the professional gates.

Anaesthesia was only latterly recognised as a specialisation in it's own right with the establishment of the Royal College of Anaesthestists (RCA) in the middle of the 20th century (Mokhtar 2003).

Sedation on the other hand is derived from the Latin "*sedare*" meaning to assuage and the term is normally used in dental practice to indicate a state where consciousness has been obtunded to a certain extent but by no means lost (Sykes 1981). However in spite of the manifest advances in pain and anxiety control together with improved communication skills, research in the USA indicates that fear of dentistry is still prevalent in the general population in the USA. Research has shown that a higher availability of dentists trained in anaesthesia and sedation would allow those patients who tend to avoid dental treatment because of fear and anxiety to receive comprehensive treatment (Dionee 1998).

In the UK, DGA has proved to be of great value in the treatment of children who may require extensive treatment. The recent changes in the guidelines presented by the General Dental Council in November 1998 mean that DGA will become less available than previously in the UK. However, while the changes may encourage the greater use of alternatives as well as a change in attitudes, it is important that these guidelines do not reduce the availability of this method of treatment for those whom DGA is still necessary (Nunn 1999).

Chapter II

The Review

A brief review of NHS Dentistry prior to the publication of the first of a series of commissioned reported in 1964.

The decision to remunerate dental treatment on a "fee for item" basis occurred with the creation of the National Health Service in 1948 and has remained unchanged to the present day. At the inception of the NHS extraction of teeth and frequently total clearance of the mouth invariably involved the use of GA, this being one of the principle methods of treatment at that time. Over the three years viz 1952 – 1955 approximately seven million GA's were administered at that time in general dental practice (Batchelor 1994). The number of GA deaths in association with that number of DGA's was of the order of 56; 20 of these deaths being associated with intravenous barbiturate as distinct from inhalation by nitrous oxide and oxygen (Goldman 1958). Resulting from the high cost of exodontias, a change of fee structure was introduced by the General Dental Service (GDS) to encourage restoration of teeth rather than extraction. Improved methods of delivery of local anaesthesia (LA) and the introduction of the air turbine handpiece led to a greater amount of conservative treatment being carried out. This directly helped to reduced the need for dental general anaesthesia (DGA) and also reduced the number of cases requiring multiple extractions. Furthermore acute inflammation and sepsis could be treated initially by antibiotic therapy and subsequently by LA. It should be noted that on the whole, the use of GA diminished and fewer teeth were extracted, the advent of intravenous anaesthesia (IV), particularly the use of brietal, gave rise to the possibility of carrying out extensive restoration work at one visit (Batchelor 1994). While those patients with a highly nervous or anxious disposition were happy to receive this form of treatment and which was correspondingly an attractive treatment option for some dentists, the potential danger of the chemical agents used together with the increase in operating time gave rise to a considerably increased risk to the life of the patient (Batchelor 1994).

In 1956 the Society for the Advancement of Anaesthesia in Dentistry (SAAD) was formed to promote the particular techniques necessary for the administration of IV anaesthesia and also to teach and develop the necessary skills. It may also be said that with the formation of SAAD an increasing interest in the possible dangers associated with DGA began to be appreciated. Batchelor (1994) estimated that in 1976 of all the GA administrations carried out $1/6^{th}$ were either sedative or intermediate techniques (IV anaesthesia). A postal survey carried out by Dinsdale and Dixon in 1976 elicited a response rate from 70% of all dentists in England and Wales indicating that of all GA's administered the majority were given to children in the 5 – 9 age group. This would appear to indicate a trend away from the administration of DGA to the large number of adults that took place in the 1950's. It can therefore be said that children now became the principle recipients of DGA for the purposes of exodontia. At the same time adults became the chief recipients of LA or sedation for exodontia and restorative treatment. The issue of providing treatment for those children with special needs which included restorative treatment as well as exodontias was also mooted at this time (Rule et al 1967).

Further to the changes in the provision of DGA, advances in the treatment of oral disease along with changing patterns of health care and preventive techniques also occurred. An important factor was the improved preventive and restorative techniques producing a major decline in the administration of DGA for children. By the time the Poswillo Report was published in 1990 DGA's (mainly for children) had dropped to approximately 300,000 in the GDS. (General Dental Services Committee Report 1998). While it might have been expected that immediately following the Poswillo Report a large drop in the number of DGA's administered would have occurred, this proved not to be the case since at the end of March 1998 the number of DGA's administered was approximately 223,000. (Dental Practice Board 1998 – DPB). This figure was almost entirely due to the increase in the number of specialist GA clinics which reached a total of 49 throughout the UK in the mid 1990's.

It may be safely said that the attitude of patients towards dental treatment has changed considerably over the last 20 years. Treatment by extractions and dentures has turned (although not altogether) to the restoration of teeth and finally towards the concept of prevention (Murray 1989). Factors behind this change of attitude and behavioural pattern relate to improved methods of dental health education and oral health promotion. While improved oral hygiene and the use of fluoride dentifrices have played a major role in the decline of dental caries, the vigorous pursuit of caries prevention programmes has done much to help in the avoidance of extraction of primary teeth. Other groups of health care professionals have a role to play in this respect. Midwives, health visitors and general medical practitioners are in a position with their contacts with mothers and young children to encourage healthy eating habits and oral hygiene methods. Of particular importance is the question of sugar intake and its regulation. It is true to say that exodontia in children is almost always due to dental decay. The influence of diet, particularly infant feeding is of paramount importance once the tooth has erupted into the mouth.

An increasing number of permanent teeth are now extracted for orthodontic reasons quite frequently under GA. Four quadrant extractions are often carried out to prevent overcrowding – this overcrowding frequently being the result of fewer extractions due to caries (Shaw 1996). It would appear that the modification of a high sugar diet in association with the proven effectiveness of fluoride either in the form of dentifrice or where a water borne scheme is in operation, has played a major part in the decline of caries with a corresponding fall in exodontia.

Changes of socio-economic factors are also important particularly as national food surveys reveal a higher consumption of sugar and sugar related products among the low income groups (Watt and Sheiham 1999). With regard to socio-economic factors and oral health inequalities, water fluoridation has proved to be of the greatest benefit in deprived areas. Indeed water fluoridation has lead to an overall reduction in caries of the order of 44% in five year old children (Watt and Sheiham 1999). However, at the present time only 11% of the population (approximately 5.5 million people) are in receipt of fluoridated water compared to 60% of the United States population. The enormous advantage of water fluoridation is that it reaches the whole population regardless of location or social position. Recent studies have indicated that five year olds from poor families (social classes IV and V) have twice as many bad teeth as

children from social classes 1 and II, ie families in a higher income category. It might be reasonable to expect that 30-40% of the UK population should ultimately be receiving fluoridated water. The main reason for the lack of action concerning water fluoridation is political. If proof regarding deficiency of water fluoridation was required, it might be stated that when the town of Wick in Scotland terminated a water fluoridation scheme, the incidence of caries in children rose by the order of some 50%. It may be said that, while fluoride has been very effective in preventing dental disease, nontheless it does not remove the cause of the condition (Rugg-Gunn 2001). Watt and Sheiham (1994) carried out a review of inequalities in oral health and concluded that while oral health has in general dramatically improved, oral health inequalities have widened markedly; the most stark examples being found in the dental caries levels of pre-school children in deprived areas. The reduction of inequalities in health has now become a major focus for government health policy since these inequalities exist between social, and certain geographical regions of the country (Wilde 2000).

Chapter III

Mortality and Morbidity associated with Dental General Anaesthesia.

From time to time there have been reports of deaths, most commonly of children, under dental GA culminating in a total of three deaths in 1998 (in the period 1994-99 eight deaths under dental GA were notified of which five were children) (CMO Report 2000). Deaths are generally uncommon during or immediately after a dental anaesthetic, however they are more likely to occur under these circumstances than with other methods of pain and anxiety control. Until 1998 the overwhelming proportion of dental GA was carried out in dental practice. It is important to note that in only seven years out of the previous 35 years there were no deaths associated with dental GA outside the hospital environment. Any death is one too many and this is particularly true if one considers that most or indeed all GA's in dentistry are for non-life threatening conditions. They are therefore all the more tragic as the majority of patients are usually fit and healthy. Investigations of these deaths have frequently highlighted factors which seemed potentially avoidable (CMO Report 2000). Each death in a dental surgery is also always accompanied by much adverse media publicity and public concern over standards of practice. Indeed investigation and enquiries into the recent deaths have been critical of the care provided in some of the fundamental areas of anaesthesia. These may be listed as follows:

i) poor pre-operative assessment

ii) monitoring of electrical heart activity

iii) blood pressure, O_2 and CO_2 levels

v) delayed start of resuscitation and transfer to critical care facilities (CMO Report 2000).

An investigation by Coplans and Curson during the period 1970-1979 considered the question of GA in dentistry in some depth. During this period more than 15 million anaesthetics were given with a total of 110 deaths. In the period 1980-1989, the number of deaths had decreased to 42 (Coplans and Curson 1993). However it was suggested at the time that the reduction in mortality was attributable largely to the decrease in the number of dental GA's administered rather than in improved standards.

Every year about 1 in 250,000 die in the dental chair undergoing dental anaesthesia in the UK (Blayney 1999). Of the total number most were young adults or children the cause of death being generally either respiratory difficulty or sudden cardio-vascular collapse - the latter possibly being due to unrecognised vasovagal syncope or ventricular arrhythmias – these arrhythmias being commonly associated with dental extractions and anaesthetic factors such as hypoxia, light anaesthesia and inhalational anaesthetic agents (Blayney 1999). In contrast over the past decade in the USA, the annual incidence of death during anaesthesia for dental procedures was about 1 in 670,000 to 1 million. However, the difference between the mortality rate in

association with dental GA between the UK and the USA may be due to incomplete reporting of both mortality and morbidity in the USA (Blanay 1999). It should be stated that

"the risk of mortality from dental GA, while extremely serious, is so rare that it is an inadequate measure of outcome" (Bridgeman et al 1999).

In the 1950's the number of deaths annually associated with dental treatment under GA numbered more than 10 and by the 1990's this had declined to one or two deaths in any one year. This would seem to parallel the reduction in the number of GA's administered for dental treatment and possibly improved standards of administration. Further, mortality cannot be related to either place of anaesthesia or to the grade of anaesthetist. Statistical analysis is not meaningful at these levels (CSAG Report 1995). It may also be added with regard to anaesthetists, that in February 1999, a postal audit of paediatric dental anaesthetic practice in Scotland demonstrated that consultants who administered most anaesthetics were experienced in this sub-speciality but would not be recognised as "paediatric anaesthetists." This factor had been noted by the dental profession for some considerable time (Wildsmith 1999).

Although much has been achieved in terms of equipment and staff training in dental surgeries, deaths have continued to occur – two to three each year, usually young adults or children who would not normally present any particular risk for GA (Cartwright 1999). The increase in GA outside hospital (up until November 1998 has been associated with the number of deaths recorded. The deaths, which occurred in the 1990's, illustrate to some extent the inability of some of the anaesthetic and dental teams to respond quickly and effectively to serious and unexpected crises (CMO Report 2000). It has been demonstrated that as long as GA is administered in the dental chair, there will be a variety of problems some of which (and their solutions) are outside the control of anaesthetists but which are amenable to their influence.

Coplans and Curson (1982) stated that

"GA is, or may not be responsible for, nor even contributing to every death with which it is associated."

They attributed death to one of three categories

i) category A indicated that the GA was directly responsible for, and the sole factor in the death of a healthy person

ii) category B stated that GA produced a fatal outcome in a patient with significant underlying disease

iii) category C stated that GA was incidental to the outcome

These categories of GA deaths were the findings of surveys in the years 1970-1979 and 1980-1989. These three categories relating to mortality are important in that, at present, reliance is placed on the accuracy of the completed death certificate for the cause of a persons' death. However, there is inconsistency in recording the association of a death under dental treatment particularly when the death has occurred sometime after and in a different place from the administration of the GA (CMO

report 2000). Where deaths occur in hospital in association with GA for dental treatment, they are reported to the National Confidential Enquiry into peri-operative deaths. At present, deaths following GA for dental treatment are notified to the Department of Health in an ad hoc way.

Where deaths from dental treatment are associated with dental GA, the coroner should be asked to notify the Department of Health as long as GA is permitted to be provided in dental practices. At the present time arrangements for monitoring mortality following GA in dental treatment are inadequate. In general, statistics and information relating to deaths in relation to dentistry in England and Wales are obtained from the Office of Population, Censuses and Surveys (OPCS) (Coplans and Curson 1993). This information may include the identity of the coroner so that copies of the notes taken on the evidence given at the inquest can be obtained. In the absence of a coroner's report relevant information may be sought from the appropriate hospital.

A number of specific recommendations were made in the CMO's Report 2000 relating to the very limited information about patients who had suffered adverse health effects following GA or conscious sedation for dental treatment. The report sets out the need to:-

i) monitor both mortality and morbidity and suggest bodies who might undertake this. For example the Royal College of Anaesthetists and the Society for the Advancement of Anaesthesia in dentistry respectively.

ii) for the GDC to consider providing guidance on the reporting of adverse reactions by dentists as a matter of good professional practice.

It might be appropriate to consider the subject of morbidity in relation to dental GA which has, until now received comparatively little investigation. Morbidity following dental GA and its relationship to anaesthesia and treatment procedures is not well understood. In a recent study Atan et al (2001) considered the variables which best related to morbidity in healthy children undergoing dental GA. These variables were then used to determine the extent and severity of morbidity experienced. The variables in relation to morbidity post dental GA were best measured by nausea, weakness, dizziness or sleepiness. Patients were found to be more likely to experience morbidity related to dental GA if they had

i) a longer GA

ii) were female

iii) were given LA peri-operatively

Patients were found to feel less pain post-operatively if they experienced local anaesthesia peri-operatively. The study concluded that morbidity could be measured in future studies using the variables selected by this study and that morbidity related to dental procedures appear to be a greater problem than morbidity related to dental GA.

A survey by Bridgeman et al (1999) demonstrated that morbidity following GA manifested itself in varying degrees of severity across a range of physiological, pathological, psychological or social effects while the most serious problems appear to be related to arrhythmias and liver damage associated with Halothane. Another study by Holt et al in 1991, laid emphasis on the fact that dental extractions under GA did produce one or more similar findings namely that 92% of children complained of one or more symptoms. There was no significant evidence to demonstrate that all the morbidity reported resulted from the GA.

In conclusion, most cases of death in the dental chair recently spotlighted in the press seem to have some element of negligence or poor practice associated with them (Patel R 2000). However, this might also highlight problems of policing rather than technique. This in turn leads back to the lack of implementation of one of the Poswillo 1990 recommendations, namely

"that those dental practices still carrying out GA in the dental surgery should be subject to inspection, monitoring and regulation."

This recommendation was finally (if somewhat belatedly) implemented and continued in force until 31st December 2001. Subsequently GA in the dental surgery then ceased entirely and was replaced by a purely hospital based service.

While dental GA has played an important part in the causation of death associated with dentistry, it is interesting to observe that two deaths were associated with sedation techniques during the period 1980-1989 (Coplans and Curson 1993). Further there has already been another death recently associated with sedation in the dental surgery (Fleming 2001). These deaths may possibly reflect the increasing substitution of sedation for GA. It is thus important to note that every patient has a variable response to the sedation agent used (Coplans and Curson 1989). It is possible that injudicious administration of powerful sedation agents by the operator/sedationist could, in the absence of suitable monitoring equipment and inadequately trained staff, prove to be just as hazardous as a badly administered GA (Anaesthesia 1993). With the diminishing number of dental GA's now being administered for exodontia, it will prove difficult in the future to assess whether the implementation or the recommendations of the Poswillo Report 1990 will have an effect on mortality in this field (Padfield 1994).

In Summary

1) The closest (and latest) estimates for adults and children combined are

- 1 death in 338,134 GAs or 3 deaths per million GAs for the year period from1991-2000
- 1 death in 177,860 GAs or 6 deaths per million GAs for the year period from 1981-1990
- 1 death in 182,327 GAs or 6 deaths per million GAs for the year period from 1971-1980

2) The closest estimates of mortality rates for adults are

- 1 death in 297,654 GAs or 3 deaths per million GAs for the year period from 1991-2000

3) The closest estimates of mortality rates for children are

1 death in 347,632 GAs or 3 deaths per million GAs for the year period from 1981-2000. Children would appear to show a lower risk re mortality associated with GA than adults. In addition, the risk is very low and relatively lower than previously thought when taking into consideration, the data of the total number of GAs for GDS only or GDS and CDS combined (Mokhtar 2003).

As GA in dentistry is now a purely hospital based service, it can be stated that death under GA in the dental surgery will never occur again. The responsibility for patient care will now largely be the perogative of the anaesthetist and theatre staff with the dental surgeon responsible mainly for the dental treatment required. Whether this will result in fewer cases of mortality remains to be seen, as undoubtedly some deaths of both adults and children have occurred within the hospital scenario. What is certain is that GA, particularly for children, will be required for the foreseeable future, thus raising the problem of access and availability of such a service.

Conclusion

- Provision of general anaesthesia has fallen steadily since the mid-1960s although there was an upward trend between 1992 and 1998.
- As the provision of general anaesthesia declined the overall number of deaths also fell.
- Following a three year period (1993-1995) in which no deaths occurred associated with general anaesthesia for dental treatment outside hospital, eight deaths occurred during 1996 to 1999, of which five were children.
- Subsequent to the General Dental Council's revised guidance in November 1998 there has been a reduction of over three-quarters in the number of general anaesthetic treatments provided in NHS general dental practice.

TABLE 1

Dental GA and Deaths in Adults and Children

Year	GAs in General Dental Services For Children	Deaths of Children	MR1 (GAs per death)	MR2 (Deaths per 1 million GAs)
1991 – 2001	1,661,861	8	207,732	5
Adults 1991 – 2000	1,767,580	8	220,947	4.4
1991 – 1995	752,916	4	188,367	5.3
1996 – 2001	908,945	4	227,236	4.4

MR1 = number of anaesthetics administered for one death
= number of general anaesthetics (Gas) in GDS ÷ number of deaths
MR2 = number of deaths in 1,000,000 anaesthetics
= 1,000,000 x number of deaths ÷ number of GAs in GDs

Mokhtar 2003

TABLE 2

MORTALITY RATES ASSOCIATED WITH GA IN GDS

Year	Number of GAs in GDS	Number of deaths	Mortality rate 1 (MR1)	Mortality rate 2 (MR2)
1965	1,322,980	4	330,745	3
1966	1,222,540	6	203,757	5
1967	1,281,800	5	256,360	4
1968	1,285,620	10	128,562	8
1969	1,231,680	6	205,280	5
1970	1,225,690	9	136,188	7
1971	1,217,950	12	101,496	10
1972	1,226,520	9	136,280	7
1973	932,770	7	133,253	8
1974	1,138,320	13	87,563	11
1975	1,056,190	5	211,238	5
1976	956,170	9	106,241	9
1977	877,040	8	109,630	9
1978	792,660	8	88,083	10
1979	703,250	9	78,139	13
1980	666,640	5	133,328	8
1981	606,510	4	151,628	7
1982	548,930	7	78,419	13
1983	464,350	5	92,870	11
1984	408,960	3	136,320	7
1985	370,070	4	92,518	11
1986	334,600	4	83,650	12
1987	345,120	3	115,040	9
1988	309,330	1	309,330	3
1989	299,760	3	99,920	10
1990	265,220	2	132,610	8
1991	198,765	1	198,765	5
1992	355,270	6	59,212	17
1993	321,177	1	321,177	3
1994	321,006	0	0	0
1995	330,297	0	0	0
1996	358,493	2	179,247	6
1997	371,817	1	371,817	3
1998	412,477	2	206,239	5
1999	380,755	3	126,918	8
2000	289,881	0	0	0
2001	11,539	0	0	0
1965-2001	24,430,608	177	138,026	7

Mokhtar 2003

TABLE 3 : DENTAL ANAESTHETIC DEATHS

YEAR	TOTAL No OF GA DEATHS	PLACE OF OPERATION		STATUS OF ADMINISTRATOR & COMMENTS
		DENTIST	HOSPITAL	
1979	9	4	5	1980 – 1989 total 42 deaths
1980	4	1 *	2 *	GMP 5 cases
1981	4	4 *	0 *	GDP 2 cases
1982	8 (1)	3 (1) *	5 (0) *	Operator/anaesthetist 4 cases
1983	5 (1)	4 (1) *	1 (0) *	Consultant anaesthetist 31 cases
1984	3 (1)	2 (1) *	1 (0) *	(or deputy)
1985	4 (4)	1 (1) *	3 (3) *	Site of Operation: Dentist 22 cases
1986	3 (2)	3 (2) *	1 (0) *	Hospital 20 cases
1987	5 (2)	3 (2) *	3 (1) *	
1988	2	1 *	1	
1989	4	1 *	2 *	
1990	2	0	2	Not available centrally
1991	0	0	0	
1992	5	3	2	GMP 3 cases / GDP 1 case
1993	1	0	1	Anaesthetic registrar
1994	0	0	0	
1995	0	0	0	
1996	2	2	0	Consultant anaesthetist 2 cases
1997	1	1	0	Consultant anaesthetist
1998	3	3	0	GDP 1 case / Anaesthetist 2 cases
1999	2			(one case in Scotland)

The figures in brackets relate to children under the age of sixteen years.

(Willings 2000)

The figures marked by * are unofficial figures

Chapter IV

The Review of the Literature

Commissioned Reports:

Commencing in 1964 a series of commissioned reports on the position of General Anaesthesia (GA) in dentistry was undertaken. The first major report was undertaken by the British Dental Association (BDA) that reported its findings in 1965. One of the principle features noted was a general fall in the number of GA's carried out since 1957 together with a fall in the number of adults in receipt of GA. The high number of GA's administered by the operator/anaesthetist was also noted, which highlighted the demand and need for post-graduate training in GA for dentists. The report further defined clinical necessity in the following terms:

> *"GA is clinically necessary for any patient who by reason of physical or psychological condition would, in the opinion of the operator be better served by treatment under GA than by other methods."* BDA 1965

The patient who, from fear, refuses all dental treatment except under GA must necessarily be included.

A report by the Standing Medical and Dental Advisory Committee of the Central Health Services Council on Dental Anaesthesia was published in 1967. This followed a specific request by the then Minister of Health for advice on the subject. The terms of reference were:

- To consider the use of GA in general dental practice and to advise accordingly
- How far the administration of GA for conservative treatment can be justified
- How far the administration of GA for any purpose without the attendance of a second practitioner can be justified
- The use of analgesia and sedation
- The report quoted the approximate number of GA's given in England and Wales in 1965 as being of the order of 1.75 million. In summing up the hazards of GA in general dental practice the report stated that mortality had fallen from 87 in 1952 – 56 to 31 in 1961 – 65. Two important factors on the general principles of DGA were stated in the report namely:
- No risk to life on account of a dental procedure is ever justified except in the extremely rare event of the dental condition itself constituting a lethal hazard to the patient
- Sedation combined with local anaesthesia was considered to be not entirely satisfactory particularly in children under 10 years of age but was considered to be an alternative to GA in certain older patients.

The final point in this report concerned the role of the operator/anaesthetist and the strong opinion was that these roles could not be combined without risk.

GA for outpatient dental surgery was the subject of the next report when the Council of the Association of Anaesthetists invited representatives from the Faculty of Anaesthesia, the Faculty of Dental Surgery and the BDA to meet under the chairmanship of Windeyer. The objective was to make recommendations on the post-graduate education in dental GA for both doctors and dentists. Among the recommendations were:-

- That the increasing use of sedation, analgesic and tranquillising drugs should form part of the training in the undergraduate curriculum
- The operator/anaesthetist role was deprecated and its elimination advised;
- There was a need for an expansion and reorganisation of post-graduate education in dental GA.

Due to an apparent increase in the numbers of deaths occurring in relation to dental GA the BDA, in December 1974, convened a working party to review the role of the operator/anaesthetist. In 1973 of the 1.2 million dental GA's administered 11% were operator administered. It was noted that between 1967 and 1973 those NHS courses of treatment, which might have included a GA, fell by 18% in England and Wales while in the same period the number of courses of treatment rose by 54%. The wider acceptance of conservative treatment and the greater use of antibiotics were cited as continuing reasons for the fall in demand. The report also made comment on a tendency of patients willing to have GA to go to those practices known to provide this method of treatment. It was also noted in the report that the increasing use of relative analgesia and conscious sedation techniques could be contributing to the fall in the number of dental GA's delivered. In conclusion the report, which was published in 1975, stated that those deaths associated with dental GA would appear to be due to a lack of training and experience among those carrying out the procedures. One issue highlighted in particular was the lack of staff training in resuscitation.

Training in dental GA was the subject of a report published in 1978 under the chairmanship of Wylie. In the report, comment was made on the increased demand for conservative dentistry. The decline in the number of patients for out-patient anaesthesia and its effects upon the training facilities available was noted. Among the conclusions and recommendations made in the Wiley report were:-

i) Detailed objectives for a core training in dental general anaesthesia covering knowledge, understanding, skills and attitudes.

ii) A list of recognised dental anaesthetists was thought to be essential and a confidential enquiry into the mortality and morbidity associated with dental anaesthesia, analgesia and sedation was urged.

Further the working party considered that a national policy for training in dental anaesthesia at post-graduate level and the establishment of a list of recognised dental anaesthetists was essential.

As a result of the Wylie report an inter-faculty working party was set up to consider this report's implementation under the chairmanship of Seward. One of the findings of this working party was that although many patients could be treated under LA and sedation, nonetheless there would remain a need for GA and specified indications for this need. The Seward Report further recommended that post-graduate training in dental anaesthesia might be made available.

In 1980 a committee on dental GA and sedation was convened under the chairmanship of Spence. This committee was critical of some of the conclusions of previous reports. One of the committees conclusions was that if hospitals regarded certain anaesthetic and resuscitation facilities as essential then dental GA's should not be administered under less favourable conditions. The committee also suggested that possibly the most sensible solution would be to create adequately equipped locations for dental GA either in a health centre or general hospital where facilities for outpatient day-care surgery were available. In the same year a thorough and comprehensive enquiry into dental education commissioned by the Nuffield Foundation, made 35 principle recommendations about dental undergraduate and postgraduate education. The only recommendation on dental GA stated that dental GA in the GDS should be limited to those dentists who have received the appropriate post graduate education and whose names were on a special list.

In 1981 the General Dental Council issued a notice for the guidance of dentists which stated.

> *"When a GA is administered it shall be by a person other than the operator and this person shall be a dentist or medical practitioner. Failure to comply with this recommendation would be considered to be infamous or disgraceful conduct in a professional respect"* (GDC 1981).

In 1983 the GDC finally proscribed the role of operator/anaesthetist. This was published as an addendum to the 1981 notice for the guidance of dentists.

The Poswillo Report 1990

It was in response to a growing concern regarding the administration of GA outside the hospital environment that the Standing General Advisory Committee commissioned an expert working party in 1989 to report on GA, sedation and resuscitation in dentistry. This committee was chaired by Professor David Poswillo and like many other commissioned reports is usually referred to by its eponymous title. Although the remit was originally for England and Wales the recommendations were in general accepted by the Scottish Home and Health Department. The report was published on a consultative basis and was divided into six chapters and seven appendices. On behalf of the government of the day Baroness Hooper responded positively to the recommendations laid out in the first five chapters. Perhaps unsurprisingly no reference was made to chapter six which dealt with the financial implications. The working party regretted the lack of reliable data from the Dental Practice Board (DPB) but were able to use data for 1989 regarding four family

practitioner committees, which did indicate a considerable difference between north and south in GA administration even if this was not wholly representative of the country. This extensive report which, although published in March 1990 against a declining background in administration of GA in both the GDS and CDS, did not see its recommendations accepted by the Department of Health (DoH) until October 1991. The terms of reference for the expert working party were as follows:

- Consider in the light of present knowledge and having regard to regional differences, the need for the use of GA and sedation in dentistry outside the hospital environment.

- Develop guidelines for the safe use of GA and sedation in dentistry together with the appropriate provision of resuscitation.

- Consider the need for undergraduate, vocational and continuing post-graduate education in GA, Sedation and resuscitation in dentistry (Grant 1998).

The principle recommendations of the report were as follows:

- GA for dental purposes should continue in dental surgeries and clinics where this is clinically justified. Its use should be avoided wherever possible since GA is a procedure that is never without risk.

- The same standards of monitoring and personnel (including premises and equipment) necessary for patient safety, should apply whenever GA's are administered.

- Sedation should be used in preference to GA whenever possible.

- GA should be administered by accredited anaesthetists in approved premises having the required standards of personnel and equipment.

- Health authorities should review the provision of consultant dental anaesthetic sessions to ensure that they are sufficient to meet local need.

- The equipment essential for patient safety should be provided and be regularly serviced and maintained.

- Good contemporaneous records of all treatments and procedures should be kept.

- Every member of the dental team should be trained in resuscitation and such training should be a team activity.

- Dental practice surgeries where GA is provided should be subject to inspection and regulation in order to set standards for patient care.

- There should be an on-going enquiry into mortality and morbidity in relation to GA and sedation for dental treatment.

- Commissioners of services should monitor waiting times for dental treatment under GA (Watson-James 1991).

The division of the recommendations was as follows:

- 22 relating to GA
- 2 relating to the definition of sedation
- 17 relating to sedation
- 16 relating to resuscitation
- 3 relating to finance

Chapter 3 of the report listed the necessary equipment required for dental surgeries and clinics to attain the recommended standards necessary for patient safety.

These were as follows:

- ECG equipment
- Pulse oximeter
- A non-invasive BP measuring device for the monitoring of a patient under GA
- A defibrillator

Chapter 4 states that sedation should be used in preference to GA wherever possible. Reference was made to both training and education for both undergraduates and postgraduates. The emphasis here was to ensure that a graduate was both educated and experienced in the elements of IV and inhalation sedation and that the process should be continued throughout professional life.

The financial implications of these recommendations for the dental practitioner were discussed in chapter six and recommendations made for reducing the extra cost of both capital and revenue. The need for adequate training facilities was stressed as it was with most of the other commissioned reports. It was further suggested that the DoH set up a standing committee on dental anaesthesia, sedation and resuscitation to assess all relevant data and report on a biennial basis.

As a result of the acceptance of most of the clinical recommendations the DoH nationally allotted non-recurrent capital and revenue financial allocations in 1992-1995 to facilitate the resource implications for training, equipment and accommodation. The monies allotted totalling some 20.6 million pounds. Subsequently a number of dental practices were awarded "Poswillo" funding while in 1995-1996 a non-recurrent revenue allocation was made to Health Authorities and in subsequent years, a recurrent edition was made to Health Authority baseline allocations to meet on-going revenue costs (Grant 1998). It might be apposite to state here that while dentists receive gross fees on a fee for item basis, they are nonetheless, responsible for all practice expenses out of these fees. Those particular practices that

applied for Poswillo Funding were only those who wished to continue an enhanced service namely covering all aspects of safety and maintenance together with the treatment of GA patients referred by fellow professionals.

The report did much to tighten up and standardise a somewhat haphazard approach to DGA particularly in those practices providing only a limited number of GA's per year. The emphasis laid on safety standards, the training of staff plus the capital costs of appropriate equipment, made it impossible for small practices to continue to supply this service. Although there had been a rapid decline in the number of GA's administered (1967 2,000,000 GA administered compared to 371,000 in 1989) there were also huge social and geographical variations in dental disease plus an equal variation in the demand for treatment (Watson-James 1991). Unfortunately the report makes little attempt to co-ordinate these factors with the incidence of GA. In spite of excellent safety records no breakdown of the circumstances regarding any death under GA has been made available. This was indeed one of the recommendations namely

"there should be an on-going enquiry into mortality and morbidity in relation to GA and sedation for dental treatment." Poswillo 1990

So far this recommendation has still not been implemented. If the Poswillo proposals are to have significance for dental practitioners, the review of the circumstances surrounding each death should be carried out to establish as to whether the new proposals (GDC Guildelines 1998) might have prevented them.

At the time of its publication and subsequently the Poswillo Report could be said to be a milestone in the development of dental anaesthetic practice. It also gave rise to a set of standards by which dentists in dental anaesthetic practice could be judged.

To summarise, it could be said that the Poswillo Report did little to reduce the number of GA's for dental treatment in the UK and indeed *dental anaesthetic clinics* were developed in the GDS subsequent to the publication of the report. Further, despite the intention to improve resuscitation training and equipment, mortality among children continued to rise.

The Outcomes of the Poswillo Report

While the Poswillo Report went a long way towards improving safety in DGA, it did not fully examine the administration of GA in the UK. In particular the inter-relationship between those GA's given by the GDS, CDS and HDS. In spite of the general decline in GA administration figures are not available to indicate which were administered by private contract fee rather than NHS fee (this still applies in the year 2001). This report was extraordinarily prescient with regard to those who should administer a DGA. The report states that GA should be regarded as a postgraduate subject its administration being carried out by accredited anaesthetists in approved premises having the required standards of personnel and equipment. The report does, however, not go to the extent that all administrators of GA should be of consultant status. There remained the fear (subsequently borne out by events) that this particular recommendation would rapidly see the end of the dentally qualified anaesthetist. The Royal College of Anaesthetists (1999) made their views clear by recommending that only specialist paediatric anaesthetists should administer general anaesthesia to very young children. Spence in 1992 stated categorically that the time had come to "go for

broke" and establish that the present equivalent of consultant anaesthetist is the only acceptable standard. (Incidentally this proved to be prophetic as in the year 2000 report the Chief Medical Officer reiterated this almost exactly.) With regard to accreditation there is evidence that few young anaesthetists are prepared to take up the administration of GDA with the result that the number of suitably qualified anaesthetists will decrease in the future (Cartwright 1991).

The publication of the Poswillo Report was expected to accelerate the decline in DGA's in general practice. Many general dental practitioners (GDP) had ceased to provide a GA service on account of the acknowledged risks and the need for expensive equipment for which there was a diminishing demand. One factor in this decline may also be the lack of adequate facilities in which to administer a GA rather than pressure from patients or referring dentists. It might also have been expected that, for those patients for whom treatment under GA was considered necessary, referral would be made to a recognised specialist centre such as a CDS clinic or hospital department. On account of the subsequent rise in the number of specialist dental anaesthetic clinics, the number of GA's rose dramatically in the years subsequent to the Poswillo Report (Heestermann-Grant 1998).

Following the Poswillo Report the GDC, in 1993 provided notes on professional conduct and fitness to practice. The 12 paragraphs set out the rules for ethical dental anaesthetic administration and sedation thus fulfilling most of the recommendations of the expert working party. These notes laid emphasis on the fact that the use of IV sedation in young children should be avoided.

In 1993 a joint working party on "GA in dentistry: continuing education and training courses for non-consultant anaesthetists" was published. This contained a detailed description of a suitable course to fulfil the training component for providers of GA for dental procedures recommended in the Poswillo Report. With regard to the aim of the course it was stated that:-

"The course is not designed to train new recruits, occasional anaesthetists or those who have withdrawn from this type of work" (Batchelor et al 1995).

In 1993 a bulletin was also published by the DoH presenting a detailed analysis of the experience of dental treatment under GA within districts in the north western region for 0 – 14–year-old children. This was notable as it was possibly one of the first attempts to gain data against which the practical implementation of the Poswillo Report recommendations can be assessed. The wide variation in the balance of service provision between the primary and secondary dental care services was demonstrated in this report (Batchelor 1995).

Subsequent to the reports already mentioned a number of independent authors have investigated various aspects of the provision of GA for dental procedures. In 1990 Smallridge et al demonstrated that there appeared to be a need for the use of GA for the extraction of teeth drawing on a sample of 836 children who had experienced this as out patients at one teaching hospital. The main reason for extraction (95%) was caries in under 9-year-olds. For those aged 10 years or over the main reason for extraction (50%) was orthodontic treatment.

Changes in referral patterns in Aylesbury and Milton Keynes following the introduction of capitation were analysed by Falcon (1993). The conclusions indicated that the vast majority of referrals were for extractions due to caries especially in children under 10. Comment was also made that the introduction of the capitation system may have been at least partly responsible for the increase in the number of cases involving GA during the study period.

In 1994 Murray considered that regarding the future of GA, there would need to be a continuation of this form of treatment in a number of areas. In addition to extractions for caries, orthodontics, restorative treatment for handicapped children and the surgical removal of teeth were cited as areas where GA would be required.

The Clinical Standards Advisory Group 1995 (CSAG).

UK health ministers set the remit of the above group in October 1992 and the report was subsequently published in 1995. The main thrust of the report was to advise on standards of clinical care, access and availability of services to NHS patients referred to outpatient and community health services for those patients who might require GA for dental treatment. The CSAG recommendations are summarised as follows:

- Positive support for dental public health preventive measures should continue
- Every encouragement should be made towards reducing the use of unnecessary GA's in dentistry
- There should be improved referral procedures for dental GA which are acceptable to both referring and clinical dentist along with standardised consent agreements
- Concentration of GA services in dentistry in specialist centres should be encouraged by targeting resources on such centres or day surgery units
- Waiting times for dental treatment under GA should be monitored by commissioners of services
- Standards of patient care should be audited including periodic inspection of facilities
- Criteria for the appropriate selection of patients for GA is required
- Educational initiatives extending skills in patient management and pain control should be promoted at both undergraduate and postgraduate levels with the aim of changing attitudes
- A prospective study of morbidity in all settings including the development of precise measures of the outcomes of dental GA should be examined
- Consideration of the method of remuneration for GA in dentistry for treatment by the GDS in the light of the proposals in the last discussion paper "Improving NHS Dentistry in 1990" should specifically be taken into account and its effects on the demand for GA

- Comparable data collation for general dental services, CDS and HDS is necessary (Grant 1998).

The report drew attention to the continuing problems relating to the quality of referral indicators for GA and standards of anaesthetic care. Reference is also made to the following:

- The existing fee structure was inappropriate to the provision of GA in the general dental services

- That the actual fee level contributed to the problem

This was mainly because just enough individuals were attracted to dental GA to provide a service, but compromised on standards because of economic pressure. The report also concluded that a significant number of GA's were being given on demand rather than to meet a clinical need and further that current financial arrangements were an incentive to perform unnecessary anaesthetics. The report highlights further aspects of concern namely with regard to the standard of referral letters. The following points were made:

- Inadequate referral letters and too much paperwork

- Not all referral letters contained the required medical history or the exact treatment plan

- Radiographs frequently contained inadequate information or were not received at all

- Not all referrals contained copies of any consultant's advice where this might have been appropriate

Finally the report suggested that there should be a trend towards seeing hospitals as an appropriate setting for all GA's and makes the point that consultants are increasingly reluctant to work in the GDS or train junior anaesthetists in the administration of dental GA. However, the report makes clear that purchasers should ensure that those patients who have need for GA services should continue to have access to these services but resist the use of GA in response to patient demand alone. Such patients in need of GA services were summed up by the report as follows:

- Those requiring surgical removal of impacted teeth

- When local anaesthesia (LA) has proved inadequate with or without sedation

- Those physically or mentally handicapped patients to whom the delivery of LA would be either extremely difficult or impossible

- Extractions in highly apprehensive children and adults (includes confirmed phobics)

- Young children who may need multiple extractions as a result of rampant caries or patients who require orthodontic treatment

- When the presence of sepsis or proven allergy contra-indicates the use of LA

Following on from one of the main recommendations of the Poswillo Report the CSAG Report states categorically that improvements should be made in the training and provision of staff together with better facilities and equipment for general dental practitioners who undertake procedures with GA.

Figures for the public health briefing to the CSAG indicated that for GDP's offering a GA service

45% used the services of a consultant anaesthetist

40% used the services of a general medical practitioner

15% used the services of a general dental practitioner

In both the CDS and GDS the great majority of patients treated under GA were children, and these were mainly for simple extractions. The figures for the public health briefing to the CSAG further indicated that in the GDS dental treatment carried out under items 24(a) (DPB Procedural Code) were as follows:

44% were for the extraction of carious deciduous teeth

18% for carious permanent teeth

19% for orthodontic extractions

13% for extensive conservative treatment

6% for the surgical removal of teeth

In the CDS 64% of GA's were for the extraction of carious deciduous teeth

17% for the extraction of carious permanent teeth

13% for orthodontic extractions

(Figures from the CSAG survey group)

GA for Dentistry in Trent 1990 – 1998

(a draft document published by the Purchasing Authority Chief Executive for Trent Region)

The key overall findings regarding dental GA in Trent Region 1998 (pre-GDC Guidelines 1998) were as follows:

- The numbers of dental GA's and providers fell for 4 consecutive years following ministerial acceptance of the Poswillo Report plus local action by health authorities
- The number of dental GA's in specialist practices rose very rapidly after they opened
- These rises were not matched by corresponding falls in neighbouring practices
- A significant number of low volume dental GA providers still remain in the GDS in Trent
- In the year 1997/9 there were 32% fewer dental GA's administered by 69% fewer practices compared to the year 1989/90

These figures are probably the result of the anaesthetic deaths notified in Barnsley and Long Eaton and as a result GA administration fell to the lowest levels of provision since 1989/90. Further the provision in the specialist anaesthetic clinics recently established in Trent region may be demand rather than need led (Heesterman 1998).

Comment must be made on these specialist anaesthetic clinics. These clinics were organised by the Poggo Anaesthetic Group which provided GA support services including the supply of dental anaesthetists and specialised equipment. In June 1998 there were 39 such clinics in England, Scotland and Wales. Advertisements for these clinics appeared regularly in the national Dental Press. These advertisements stated that adults and children were accepted on referral for any treatment required under GA, both in NHS and private basis with all patients being seen within days.

General Dental Council Report 1998

"Maintaining Standards. A Guidance to Dentists on Professional and Personal Conduct"

In November 1998 the GDC changed the guidelines governing GA in general dental practice and CDS clinics. Comment was made that the report arrived on the ***11th day of the 11th month*** – possibly signifying the end of a long conflict in dental anaesthesia (Wraith 1999). The new guidelines effectively restricted those deemed suitable to administer GA to the catagories detailed on page 28, namely items a), b), c). In the first paragraph 4.8, the risks of GA as defined by the Poswillo Report were reiterated namely that

"GA is a procedure which is never without risk" (Poswillo 1990).

and went on to state that GA should only be considered if there is an overriding clinical need and alternative methods of pain control had been explained. The report did not go as far as to actually ban dental GA in general dental practice however the guidelines now make it very difficult for dentists to offer this service to their patients. In addition the GDC amended its guidelines relating to the responsibilities of both the referring and obligation of the treating dentist to ensure that only certain anaesthetists namely consultant anaesthetists, undertook GA for dental treatment. In this respect the guidance makes clear the responsibilities of both the referring and the treating dentist and what conditions must be met before any treatment is given under GA. While the GDC expected the revised guidance to greatly reduce the incidence of GA in general dental practice, it nonetheless recognised that there would be an appreciable impact on patient services.

When considering the new GDC guidelines, recent newspaper headlines have to be borne in mind particularly with regard to the three child deaths in 1998. It may be said that politicians picked up on the public mood and reacted by asking the dental profession how future deaths might be avoided. This was important as public and political confidence in self-regulation in dentistry (as well as medicine) could be said to be looking decidedly uncertain. It might have been concluded that after the events of 1998 the principle of self-regulation itself was at stake. It is for this reason that the GDC produced the guidelines in the interests of patients given that the welfare and safety of patients was the Councils principal concern. The amendment of the GDC's guidance in relation to GA in dentistry follows in sequence the Poswillo Report in 1990 and the CSAG Report in 1995. Of particular interest is the fact that this is probably the first occasion where a professional namely a dentist has been made responsible for the standards of another professional namely an anaesthetist (Harvey and Green 1999). The guidance emphasises the necessity of close co-operation between dentist and anaesthetist particularly the question of training together and the frequent simulation of emergencies.

Regarding personnel required these should consist of the dentist assisted by a dental nurse, the anaesthetist assisted by an Operating Department Assistant (ODA) and a minimum of one recovery nurse. In dental practice documentation and communication are paramount and the guidance further requires written consent, pre and post operative instructions to the patient as well as medical anaesthetic and recovery notes (Wildsmith 1999). Evidence is also required of agreed protocols for advanced life support and transfer to a critical care facility. Equipment used must be specifically designed for dentistry and should have a full range of monitoring, checking and maintenance procedures. Arrangements for recovery and discharge are defined plus a requirement for audit of the activity, techniques and complications that may arise. In summary the guidance is likely to result in considerably less GA in dentistry and there is quite correctly emphasis on training and standards of practice.

A summary of the GDC guidelines is presented below

Duties of the referring dentist

DECISION TO REFER

4.9 The decision to refer a patient for treatment under general anaesthesia should not be taken lightly. As part of this decision, a full medical history of the patient must be taken and agreement to refer obtained following a thorough and clear explanation of the risks involved and the alternative methods of pain control available. Clear justification for the use of general anaesthesia together with the details of the relevant medical and dental histories of the patient, must be contained in the referral letter. The referring dentist must retain a copy of this letter. *See also 3.3*

Duties of the treating dentist

DECISION TO TREAT

4.10 Before carrying out treatment under general anaesthesia a thorough and clear explanation of the risks involved and the alternative methods of pain control must be given. *See also 3.4*

MEDICAL HISTORY AND CONSENT

4.11 When the decision to carry out treatment under general anaesthesia has been finally agreed by the patient, dentist and anaesthetist, written consent must be obtained. See also 3.7

INSTRUCTIONS AND RECORDS

4.12 In advance of the procedure patients must be given clear and comprehensive pre- and post-operative instructions in writing. Careful contemporaneous records must be kept of all the procedures undertaken. *See also 4.3*

RESPONSIBILITIES

4.13 A dentist who makes arrangements for the provision of general anaesthesia for a patient must:

i) ensure that they have the assistance of an appropriately trained dental nurse. *See also 3.8*

ii) ensure that the general anaesthetic is administered by an individual who:

a) is on the specialist register of the General Medical Council as an anaesthetist. Such specialists are advised to comply with the voluntary Continuing Medical Education requirement of the Royal College of Medicine

or

b) is a trainee working under supervision as part of a Royal College of Anaesthetists' approved training programme,

or

c) is a non-consultant career grade anaesthetist with an NHS appointment, for example a staff grade or associate specialist, working under the supervision of a named consultant anaesthetist who must be a member of the NHS anaesthetic department where the non-consultant career grade anaesthetist is employed.

d) is supported by an individual specifically trained and experienced in the necessary skills to assist in monitoring the patient's condition and in any emergency. Contemporary standards of monitoring should be adopted; the current Recommendations for Standards of Monitoring during Anaesthesia and Recovery issued by the Association of Anaesthetists of Great Britain and Ireland are appropriate.

iii) be satisfied that there is written protocol, arranged in conjunction with and agreed by the anaesthetist, for the provision of Advanced Life Support. In this connection the current guidelines issued by the Resuscitation Council (UK) are appropriate. The protocol must include appropriate arrangements for the immediate transfer of a patient to a critical care facility. Such arrangements must be agreed between the parties providing the treatment and the providers of the critical care.

RECOVERY AND DISCHARGE

4.14 Patients who are recovering from general anaesthesia must be appropriately protected and monitored continuously in adequate recovery facilities. Monitoring must be undertaken by the anaesthetist or a dedicated individual who is appropriately trained and directly responsible to the anaesthetist. When in the opinion of the anaesthetist, the patient is sufficiently recovered to leave the premises, the patient must be accompanied by a responsible adult. All patients must be assessed specifically for fitness for discharge. *See also 3.8*

TRAINING

4.15 All those involved in the provision of general anaesthesia or the supervision of patients during recovery must train together as a team to deal with an

emergency. Resuscitation procedures must be practised frequently in a simulated emergency as a routine training exercise.

Current guidelines such as those issued by the Resuscitation Council (UK) should be adopted.

Dental Anaesthesia Committee

In February 1999 the Royal College of Anaesthetists (RCA) published their *"Standards and Guidelines for GA for Dentistry"*. The College had previously established a Dental Anaesthesia Committee to examine the role of GA in dentistry and the report of February 1999 was the result of their deliberations. The President of the College had already expressed concern that not all the Poswillo recommendations had been implemented. The President had further commented on the low fees for GA in the GDS. He concluded that, for clinics to be financially viable there was manifestly an incentive to treat as many patients as possible in some instances using drugs and techniques not currently in the mainstream of dental anaesthetic practice.

In this report the RCA considered that GA should be strictly limited to those patients and clinical situations in which LA (with or without sedation) was not an option. Further the RCA considered that GA should not be administered as a result of patient (or dentist) preference and pressure to decrease the number of GA's must be continued. The key feature of the document states that

"the RCA expects the same standards in dental anaesthesia as are widely accepted for anaesthesia in other clinical settings in the UK"

The guidelines of the RCA noted that fear prevented many patients in the UK from seeking regular dental care and only attended for treatment when compelled by severe pain. Many patients appear to have a somewhat cavalier attitude to GA regarding it as an apparently easy option, and therefore putting GA in the position of being a method of anxiety control rather than pain control.

The Dental Anaesthesia Committee (DAC) produced three key elements from three publications in 1999 one of which was the RCA Guidelines the other two being

i) The GDC Guidelines and

ii) An editorial on dental anaesthesia published in the Journal Anaesthesia in 1999 (Cartwright 1999).

- GA should be strictly limited to those patients and clinical situations in which it would be impossible to achieve adequate local anaesthesia
- Patients who, because of problems related to age, or physical/mental disability, are unlikely to allow safe completion of treatment
- Patients in whom long-term dental phobia would be induced or prolonged.

It was further stated by the committee that where GA was administered, the clinical setting should equal that provided for GA as for other surgical specialities. Standards

of patient assessment, consent, equipment, choice of drugs, aftercare and audit should be the same as in other settings. The committee stopped short of recommending that all GA's be given in a "hospital" for a number of reasons.

i) it is quite difficult to define a hospital

ii) some extremely well run dental anaesthetic facilities are outside a hospital complex

iii) the restriction of dental anaesthesia to hospitals would carry significant difficulties in some areas.

Finally, the aim is that GA for dentistry will be restricted to areas which have all the back-up facilities human and physical, that one would expect in an NHS District General Hospital. For the first time the committee defined the categories of anaesthetist who are acceptable to the College. These were:

i) individuals on the specialist register

ii) trainees working under supervision in programmes accredited by the College

iii) non-consultant career grades (NCCG) working under the line responsibility of a named consultant anaesthetist in an NHS department.

In summary a quote from the press release of the RCA 2nd March 1999 might be appropriate, namely

"The RCA recommends that only specialist paediatric anaesthetists should administer GA to very young children. By following the RCA's standards and guidelines on patient assessment, the clinical setting, equipment and drugs, staffing standards and training, effective and safe treatment for patients will be provided."

On the future of GA in dentistry the RCA considered the way forward as being

i) Greater patient education on the varying techniques available for the control of pain and anxiety in dentistry together with a careful explanation of the risks of GA

ii) Wider training of anaesthetists and dentists in the techniques used for the control of pain and anxiety in dentistry

iii) A change in attitude by patients and professionals towards the use GA in general dental practice. (It should be remembered that GDA is traditional to the UK and little used in most European countries)

iv) An audit of activity both of numbers and of quality is essential as outcomes must be addressed. Effective audit should monitor the service and provide a sound basis for continued improvement.

Proscription of Halothane

Following the advice from the Chief Dental Officer (England) on the restrictions in the use of halothane for paediatric GA's (BDA News January 2000) the Committee on Safety of Medicines (CSM) has advised that the use of Halothane in paediatric dental anaesthesia should be restricted to hospital only.

In a recent randomised trial, (Blayney 1999) indicated that a higher frequency of ventricular arrhythmias occurred in children who received Halothane than those who received Sevoflurane. It was further stated that short episodes of ventricular tachycardia were recorded only in children who received Halothane.

It was correspondingly concluded that Sevoflurane was a safer anaesthetic than Halothane in paediatric GA.

It should be further noted that malignant hyperthermia remains a lethal condition if triggered in a situation when immediate diagnosis and treatment with Dantrolene is not available as may be the case outside the hospital environment.

Chief Medical Officer/Chief Dental Officer Report July 2000

This report *"A Conscious Decision"* finally heralded the removal of GA associated with dentistry from non-hospital settings. The report was regarded as watershed in that the concept of conscious sedation for dentistry was no longer considered alongside that of GA. The report also pointed out that GA for dental treatment should only be used when clinically necessary and that other methods of pain and anxiety control should be used whenever possible. The report further states quite specifically that subsequent to 31 December 2001, all GA for dental treatment should be provided in a hospital setting. These hospital settings must have a critical care facility to be available on the same site. This reinforces the earlier GDC guidance namely that the need for advanced life support should be available when DGA is provided. The report makes it abundantly clear that GA for dentistry in the future will be carried out in a hospital setting while conscious sedation will belong (in general) in mainstream dentistry. The report could be said to take the concept of pain and anxiety control forward on two fronts –

i) it restricts dental GA to district general hospitals and it is interesting to note that the report defines a DGH for the first time. (This raises the interesting point for medical practitioners who may well wonder what and when something is going to be done about those medical procedures carried out under GA away from the Intensive Care Unit (ICU) facilities of a District General Hospital (DGH)

ii) the report supports and reaffirms the guidance on conscious sedation issued by the GDC in May 1999. Further if a patient is referred for sedation the dental practitioner will have to satisfy his/herself that the referral practice or hospital scenario is an appropriate place for that particular patient to be treated. This may give rise to the vexed question of how to "vet" the appropriate specialist services.

iii) A great deal is made of the requirement to collect data on fatal and non-fatal complications of both GA and conscious sedation for dentistry. Indeed *"Maintaining Standards"* may need to be amended to encourage such reporting (Pike 2000).

iv) There is a firm focus on safe practice and a strong incentive to move undergraduate dental teaching to an acceptable standard. Personal dental services (PDS) schemes around the UK have highlighted the fact that very few dentists have conscious sedation skills and if the number of GA's is to be truly reduced, conscious sedation skills must be more widely available.

v) As there is very limited information about patients suffering adverse effects following GA or conscious sedation for dental treatment, better data needs to be obtained on the fatal and non-fatal complications of GA and conscious sedation for pain and anxiety control. Without information of this kind risks inherent in a course of treatment cannot be fully assessed nor can patients and GDP's be provided with appropriate data regarding those risks.

vi) Higher standards of competence in resuscitation for personnel working on patients' treatment under GA and conscious sedation for dental treatment must be attained

vii) All instances of GA and conscious sedation equipment failure must be reported to the Medical Devices Agency.

viii) Funding incorporated in Health Authority guidelines in 1995/96 should continue to be used for the provision of high quality GA and sedation services.

New Regulations for Dentists Providing General Anaesthesia in General Dental Practice December 2000

Following the CMO/CDO Report July 2000 (A conscious decision), new regulations relating to those dentists currently providing a GA service in general dental practice were announced in December 2000, these are summarised as follows:

i) health authorities are obliged to prepare and operate a separate list of dentists providing GA

ii) those dentists providing GA have an obligation to join this health authority GA list

iii) a condition of entry to the list is that practice premises are inspected by the health authority

iv) it will be mandatory for a dentist to admit without notice, a dental advisor or other person nominated by the health authority who wishes to inspect the practice premises

v) the first inspection after entry to the list will be by appointment but subsequent inspections will be unannounced

vi) health authorities should also ascertain when GA sessions would normally be held to ensure that the practice is actually providing GA when the inspection takes place (Editorial BDA News 2000).

In summarising the various reports and papers a number of common themes can be identified. There is a continuous move to impose (largely through legislation) standards relating to the provision of GA for dental procedures. While these standards relate to both equipment and training, it would appear that the recommendations concerning equipment have been better implemented than those for training. Questions are also raised about the availability of facilities required to implement the training requirements recommended in the Poswillo Report. There is also comparatively little data in the treatment carried out under GA and the reason for this type of treatment. It would appear that more accurate information is required before the provision and distribution of GA and sedation services can be balanced against need.

The regulations of December 2000 could be said to be the final step in the removal of dental GA from the NHS General Dental Service.

In simple terms there will be

i) no GDS fee for DGA

ii) stricter rules on referral and alternatives

iii) Health Authorities (HA's) to monitor cessation of GA

iv) Date for cessation of GA in the private sector 31.3.2002

In Wales, it is understood that although the guidance for England is also applicable, it may be that the interpretation of critical care facilities may include somewhere other than a hospital. This would give great cause for concern in view of the different interpretation of what is a vital safety issue in the clinical care of patients (BDA News 2001).

The current situation 2003

i) no non-hospital GA's

ii) dental hospitals are not exempt

iii) a small amount of funding for hard-pressed HA's in 2001/2002 to supply a hospital based GA service

iv) no funding in 2002/2003

v) encouragement to reduce still further more provision of GA

Summary of the Guidance Reports

While all the varying reports have made a contribution towards the issues of training, safety and standard of equipment, it may be said that the Poswillo report and the report by the Dental Anaesthetic Committee were perhaps more specific. Bearing in mind the findings of the General Dental Council Guidelines (1998), the Dental Anaesthetic Committee report was perhaps the most far seeing. This might be finalised by two of the findings of that committee already mentioned in the review of the literature, namely – greater patient education on the varying techniques available for the control of pain, and a wider training for anaesthetists and dentists in the techniques used for control of pain and anxiety control in dentistry.

As GA in dentistry is now a hospital based service, the various reports are now largely academic. However, they did provide a strong basis for those anaesthetists and dentists involved in the administration of GA, particularly with regard to the issues of both training and safety. Sadly, a very small number of clinics/dental surgeries did not heed the wisdom incorporated within these reports, with the result that a small number of unnecessary and tragic deaths of children occurred. In fairness, it has to be said that had these few dental surgeries who provided a GA service been subject to inspection and monitoring on a regular basis, it is almost certain that the tragedies that occurred could have been avoided. For this, the local health authorities concerned are partly responsible for failing to appoint the necessary dental practice adviser whose responsibility it was to maintain regular inspections of those surgeries still maintaining a GA service.

Chapter V

Social Class and Its Relation to Tooth Extraction and General Anaesthesia

Exondontia in children is almost always due to caries (Murray 1989). In this respect the influence of diet is extremely important once the tooth has erupted into the mouth (Murray 1989). Sugar in the form of sucrose or glucose would appear to have the most cariogenic effect. The modification of a high sugar diet together with the proven effectiveness of fluoride particularly when incorporated into a toothpaste or where a water fluoridation scheme is in operation, has resulted in a declining caries experience and hence the reduction in exodontia in children (Murray 1989). It should be noted that dental health may not be a priority in the lower social domain and is thus quite frequently low in peoples' priorities. Exodontia in children may frequently be closely associated with social deprivation.

In a recent survey in Leicestershire (Landes & Bradnock 1996), Jarman scoring was used to test the number of referrals for exodontia under GA in relation to areas of residence (postal codes) The Jarman score was positive for 62% of referrals. It was noted that the large number of referrals with positive Jarman scores indicated that many of the subjects in the study came from poor social backgrounds (Jarman 1983).

It might be appropriate here to pass comment on the origin of Jarman scoring in relation to the under-privileged areas of the UK. In 1979-80, the Royal Commission on the NHS, the Black Report, the Royal College of General Medical Practitioners surveys of primary health care in London, the Acheson Report and several other publications drew attention to large geographical variations and problems dealt with in primary care services and also variations in the characteristics of the services from area to area. Both the report of the joint Department of Health and Social Security and GM Services Committee working party on under-developed areas and the Acheson Report suggested that there was a need to identify those areas where the difficulties were greatest in the under-privileged areas with a view to improving services. The idea was then conceived that it be possible to draw up maps on a Ward basis for each Family Practitioner Committee area. Scores for each Ward could then be given based on the waitings of all UK General Medical Practitioners and also based on the waitings of the GMPs of each Family Practitioner Committee. The general idea was that those FPCs with under-privileged Wards would be obliged to keep a list of patients living in those areas. In relation to dentistry, the name of the patients GMP was obtained to establish a Jarman score which could be related to the patients area of residence. Correspondingly wards of residence could be identified with modern postal codes, those patients with a positive Jarman score being associated with an area of social deprivation (Landes & Bradnock 1996).

In 1985 a child dental health survey indicated that children who had the poorest dental health also came from the most deprived backgrounds (HMSO 1985). Low social class was also associated with poor uptake of dental services and irregular attendance. In 1968 Bullman et al showed that patients of lower social class were more likely to

attend only when they had an acute dental problem. Jones et al (1997) stated that a strong association between caries and deprivation was apparent at all population levels both in fluoride and non-fluoride areas. The authors made comment that reducing deprivation would require enormous resources, but fluoride using modest resources, would improve dental health in the socially deprived. Beal and Dixon (1974) indicated that mothers of low social class were more likely to request extraction of teeth as opposed to mothers of a higher social class who were more likely to opt for restorative treatment. It may be noted that oral ill health shows a chronic positive social class gradient as does every other chronic lifestyle related disease (Grace 1999). These factors along with Jarman scoring give an indication of the strength of demand for extractions under GA. A survey by Landes and Bradnock in 1996 concluded that the majority of patients requiring GA for exodontia were either pre-school or school children. In most cases dental decay in the deciduous teeth was the major reason for extraction as there was a risk that very young children namely under five years old from poor social backgrounds were at greater risk of repeat anaesthetics. The above survey also indicated that poor dental attendance re-enforced the conclusion that many parents from poor social background do not, in the main, take their young children to the dentist until they are in pain. A further conclusion maintained that consideration should be given to the removal of all carious teeth present in the child's dentition. Another survey (Boulanger 1990) indicated that children with a large number of carious teeth are unlikely to withstand a long series of dental restorative visits and that the removal of all decayed teeth under GA was therefore advisable.

To summarise, it might be stated that GA administrations have not declined in parallel with the decline in caries experience. This is probably due to the fact that both dental caries and the provision of GA are independently influenced by a wide range of social and other factors. In attempting to measure the decline in caries experience and the number of GA's given, much would depend on the indicies used and the ages of the population involved. While the DMFT is the total accumulation of teeth with a history of caries attack, it is also an irreversible index (viz carious teeth do not heal) which can only increase with the age of the individual. A mean DMFT is thus highly sensitive to the age range of the population involved.

Other factors such as changes in treatment patterns, greater awareness of GA risk, the introduction of more stringent guidelines and introduction of capitation have all influenced the level of GA administration. Caries is greater in the lower social classes and in social groups whose experience is classified by lower income and poor educational attainments thus giving rise to a social inequality, which cannot be eliminated by water fluoridation alone. A reduction in oral health inequalities will only be achieved through the implementation of effective and appropriate health promotion policies, which focus action on the underlying social economic and environmental causes of dental disease (Wilde 1998). Deprivation does not necessarily cause tooth decay. Frequently the cause of dental decay results from poor diet such as high frequency sugar intake and failure to brush with a fluoride toothpaste. The President of the British Fluoridation Society stated that

"In water fluoridation we have a public health measure that could safely and massively reduce the need for tooth extraction. It is not acceptable that a large

population with high levels of dental disease are being denied the benefits of this means of caries prevention" (Jones 1999).

This statement was made as a reminder that in one year since January 1998 there had been three deaths of children undergoing GA for exodontia. The president further pointed out that only 11% of UK drinking water had been subject to the fluoride process. It was also noted that due to deprivation some inner city patients may not be able to afford fluoride toothpaste or brushes.

"The implementation of water fluoridation has halved tooth decay in 5 year old children thus reducing to a certain extent the dental caries divide between rich and poor. It was to be hoped that Water UK set up in April 1998, to represent the whole of the UK water industry will address the issue of fluoridation to ensure that the decrease in dental decay is a continuous process" (Jones 1999).

Unfortunately progress has been slow in extending community fluoridation throughout the United Kingdom, and in (October 2004) the only major schemes were in the West Midlands and in the North West of England. New legislation may help the decision making process, and a paper by Bardsley et al provides useful additional evidence to those involved in the implementation of water fluoridation schemes (Bardsley et al 2004).

Chapter VI

Anxiety and Pain Control

"Dental pain may be described as an alarming and disabling condition which often has an impact on everyday life. Of the seven types of pain investigated in the Nuprin pain survey of the US population it was demonstrated that dental pain was most likely to disrupt sleep and daily activity" (Slade 2001).

The International Association for the study of pain has defined pain as

"An unpleasant, sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."

Pain like anxiety is a personal experience. Although there are verbal and non verbal correlators of discomfort, a dentist may not always have an accurate view of the degree of pain a patient is feeling (Kent 1998).

In fact dental pain is the most frequently reported type of pain in the oral facial region which has a substantial impact on public health in part because its severity is frequently sufficient to have an impact on everyday life (Slade 2001). Dentists have a duty to provide and patients have a right to expect adequate and appropriate pain and anxiety control (GDC Guidelines 1999). Despite a reduction in caries in recent years, dental disease still exists to a greater or lesser extent. Dental disease produces chronic pain and it is possible that up to 1/3 of the population cannot function for limited periods on account of dental problems. In the UK many surveys (Lindsay 1989; Kent 1998) have demonstrated that fear of dental treatment is the most important deterrent to attendance. By definition anxiety is said to be a feeling of discomfort while fear is considered to be a reaction to a specific event or object (Kent 1998). Fear of treatment is highly persistent and has changed little even with relatively pain free dentistry. This fear is highly correlated with the expectation of pain which may sometimes occur (albeit infrequently) with the failure of LA. However studies have shown that LA can fail to protect the patient from sudden pain in 13% of treatments on average (Lindsay 1993). There is also evidence that fear of dentistry affects appointment keeping and attendance on a regular basis. (Stewart 1994 and Wardle 1982), found a higher anxiety level in those patients who had not been to the dentist within the previous two years than those who attended within this time. Fear of dentistry may be so intense as to seem out of proportion to the actual threat and does not respond to any sort of reason – such fears being known as phobias. Some of these phobics may only accept treatment under GA if the help of a clinical psychologist is not available or unsuccessful.

It was postulated by Shaw in 1975 that anxious patients have had an unpleasant experience in the past, which has, lead them to believe that dental care invariably

involves pain. In a survey carried out by Shaw (1975) mothers of children were questioned regarding their child's previous experience of dental treatment. The results indicated that the anxious children were more likely to have had an extraction on their first visit to the dentist – many of them finding the experience traumatic. In the same survey the results showed that mothers of anxious children were themselves more anxious and were more likely to make comment on previous distressing experiences.

From the behavioural point of view comment must be made on a survey carried out by Dionne et al in (1998). In this survey the authors conducted a national telephone survey to compare dental anxiety and the use of pain and anxiety control measures in the general population. Almost 30% of respondents reported being nervous, very nervous or fearful of visiting the dentist. The data resulting from the survey suggested that fear of dentistry was still prevalent and that patients who were fearful would seek oral health care to a greater extent if GA or conscious sedation were more readily available. Fear of dentistry in the general population is an indirect measure of the failure of current therapeutic approaches to reduce pain and anxiety sufficiently to enable people to visit the dentist. A quote from the Journal of the American Dental Association in 1998 states that

"Until recently the need for GA or conscious sedation to overcome dental fear or anxiety has not been fully studied."

A postal survey conducted by Gordon et al in 1998 (in the US) of patients with special health care needs, demonstrated that in the youngest group of respondents (aged less than 30 years) 40% indicated that they would visit the dentist more frequently if conscious sedation or GA were offered. In a summary of these two surveys it was demonstrated that a greater availability of dentists trained in anaesthesia and sedation would permit patients, who now avoid dental care because of fear and anxiety, to receive comprehensive treatment in a dental surgery.

When the data is extrapolated to the US population as a whole it reveals that approximately 45 million people are very nervous or terrified of visiting the dentist – some 23 million avoiding dental care because of fear. At least part of this enormous number of patients might be willing to visit the dentist more frequently if GA and conscious sedation were more readily available.

Pain and anxiety control is one of the most important parts of a patient's treatment as this is the part that they talk about and remember after. As GA in the UK is now much more difficult to justify, all other aspects of pain and anxiety control have been thrown into much sharper focus (Pike 1999). Part of the delivery of adequate pain

and anxiety control is about communication and listening to patients together with the appropriate pain control technique to suit both the individual patient and the treatment plan. The pain control technique may include behavioural management, LA and all the conscious sedation methods that are available. It should be noted that when dealing with children the unco-operative child might not necessarily be anxious. Anxiety experience by dental patients is of concern partly because of its effect on patients and partly because of its effects on dentists themselves. Finally pain and anxiety control in the future should have a much greater prominence and be applicable to all dentists.

It may be added that while some pain can be attributed to transient oral lesions or tooth exfoliation, the most consistent clinical correlate of dental pain is caries experience as measured using the dmf and DMF indices. There is also evidence that the caries-pain association is greatest in populations with reduced access to care, such as children from lower social classes and populations where dental caries is largely untreated. However, since pain is known to have both biological and psychosocial components, it is also possible that children's socio-economic circumstances act as mediating factor Slade (2001).

Summary

The last sentence of this chapter sums up the rationale behind the concept of pain and anxiety control. Happily, it would appear that most dentists now take this question seriously, with the result that there are now fewer (but still a considerable number of anxious patients, frequently older people with long memories) so there are now few patients who are now fearful of having dental treatment. Pain control techniques are not simply centered around LA/sedation but embrace the whole concept of behavioural management, which is mainly defined by good communication and the ability to listen. It is unfortunate that some older patients did experience "bad times" in the past which are not easily forgotten, and as a result fear of dental treatment may never be lost, and even more unfortunately may be transmitted to the immediate younger generation. As these people very often required GA in the past to conquer an inherent fear of dental treatment, the question of satisfactory pain and anxiety control together with the loss of GA has assumed a much greater prominence.

Chapter VII

A study of the changes in the provision of dental anaesthesia following the revised ethical guidance introduced by the General Dental Council in November 1998.

Aims and Objectives of the Project

Prior to the revised GDC Guidelines of November 1998, there was evidence that the number of GA's administered while generally levelling off as a result of the Poswillo Report in 1990, were actually beginning to rise in certain areas of the UK from 1993 onwards. It was on account of recent tragic deaths under GA in the dental surgery that the GDC was compelled to act positively by introducing its revised Ethical Guidance in an attempt to radically reduce the number of GA's administered in general dental practice. The Guidelines were particularly applicable to the administration of GA's in premises outside the hospital environment, namely the dental surgeries of General Dental Practitioners and Community Dental Officers. As a result of the guidelines there has been an appreciable impact on patient services with some GDP's extremely concerned that they were offering an incomplete service to patients, particularly children where there might be no credible alternative. The Poswillo Report (1990) strongly advocated the use of sedation in preference to GA in the interests of safety. This aspect has been explored in the questionnaires sent to referring practitioners in Lincolnshire. With the use of GA considerably restricted the Guidelines of November 2998 have sought to encourage the use of alternative methods of pain and anxiety control. These include sedation, LA, and hypnosis as well as enhanced communication skills and a greater understanding of behavioural science. With GA effectively removed from the armamentarium of the GDP and the relatively few GDP's actually practising sedation techniques, access and availability to sedation services in a large rural county such as Lincolnshire have given rise to considerable problems of implementation. These trends and the related problems will be examined in the course of the study.

With dental GA now regarded as a post-graduate subject (Chapter 3 Poswillo Report 1990) and all anaesthetics to be administered by accredited anaesthetists, the problems of the administration of GA in the future will present immense difficulties in its availability for those who still require it.

To complete the background to the study, consideration will be given to the underlying theme of the Poswillo Report (1990) namely safety in the provision of GA outside the hospital environment.

The report of the Working Party of 1990 states that

"although GA in dentistry has an excellent safety record (it has been used in dentistry for 150 years) no dental GA is entirely without risk."

As well as increased sophistication in the techniques used in the administration of GA and an increased awareness of the associated risks, attempts have constantly been made over 3 decades to improve the standards of training and the facilities associated

with dental GA (MacPherson 1996.) Although various working parties made recommendations, previously referred to in the literature review, two of the Poswillo recommendations were not implemented probably in part due to lack of financial resources. The recommendations which were not implemented were:

i) there should be an ongoing enquiry into mortality and morbidity in relation to GA and sedation for dental treatment

ii) that dental surgeries/premises where GA is provided should be subject o inspection and registration

The results of this lack of the second recommendation have been profound and contributed to the reasons for the final and subsequently terminal report in the use of GA in dental surgeries in the UK. In 1998 two children died under GA in two dental practices in England. Enquiries revealed deficiencies in the clinical care provided of such a serious nature that one of the anaesthetists concerned was disciplined by the GMS and the other found guilty of manslaughter (Landes 2002). It may be postulated that had dental surgeries where GA was carried out been subject to inspection and regular monitoring, it is possible that these deaths associated with GA could have been avoided. A failure to promote the appropriate funding environment in the UK has not encouraged better dental treatment for children in the NHS. Further, there was a failure to produce an environment where GDP's providing a dental GA service were rewarded for quality of care rather than quantity of activity (Landes 2002). When dental services are not reliant 'on activity for income' there is far more scope to address issues of quality and promote alternative treatments for patients requiring GA.

Dental Anaesthetic Practice

Changes introduced by the General Dental Council Guidelines 1998 in Lincolnshire

Background

Due to the paucity of published research on agreed indicators/criteria leading to

i) the choice of GA for pain and anxiety control in dentistry

ii) on the opinions and attitudes of parents/patients

an attempt has been made to obtain and evaluate views of referring dentists, dentists working in referral centres and parents/patients. The intention of the study is to investigate the possibilities of auditing the referral process not only from the dentist's viewpoint but also from the parents/patients perspective.

Aims of the Research Project

To develop audit tools and to audit the implementation of the revised GDC Guidelines (1998) on GA in Lincolnshire.

Objectives

i) To monitor compliance with the GDC Guidance both in terms of the documentary evidence from the referring dentist and from the experience of the operating dentist and their patients.

ii) To elicit the views of dentists and parents/patients by means of interviews and questionnaires at various stages in the referral process

iii) To carry out this audit at the following stages

a) the referral decision

b) the referral letter/proforma

c) the pre-GA assessment visit

d) the post-GA assessment visit

The Audit Process

Audit questionnaires were developed using the Delphi technique whereby open questions were addressed to subjects at interview and the range of responses used to formulate the final structured questionnaire. (see Appendix One) An anonymous self-administered questionnaire as the mode of data collection was considered advisable on two counts.

i) simple to prepare and forward

ii) could be sent to all GDP's and CDO's simultaneously

Reid (1993) maintained that response rates tend to be low with self-administered questionnaires. However in the present instance the response rate from referring GDP's was of the order of 79% in Lincolnshire. (Total number of questionnaires sent out was 146 in Lincolnshire)

Methodology

The design and methodology of the study is encapsulated in the Audit process. The number of practising GDP's and practice addresses were obtained from the relevant FHSA in Lincolnshire. The number of CDO's and clinic addresses were obtained from the relevant line managers in Lincolnshire. All dentists received identical questionnaires. In order to obtain approval for the study, representation was made to

i) the local dental committee in Lincolnshire

ii) the CDS/GA centres in Louth, Boston and Gainsborough

On a region-wide context, approval was sought from dental service managers and the Trent Dental Public Health consultants Group.

The format used within the questionnaires involved three (3) types of questions:

i) Closed questions (Yes/No) were regarded as providing greater uniformity and simplicity. Frequency questions (None/Little/Considerably) allowed for a wider range of response.

ii) Multiple questions (Examples of dental treatment offered) were included in order to give greater validity to the questionnaire.

Free text responses (open questions) were put forward for certain questions. (questions answered in the subjects own words with no prompting from the interviewer) (Abramson 1990).

Validity and Reliability are fundamentals within the research process.

Validity indicates the

"adequacy with which the method of measurement does its job"

(Abramson 1990).

Reliability is concerned with consistency of measurement. Burns and Grove (1987) define reliability as

"how consistently the measurement technique measures the concept of interest."

Chapter VIII

Development of Questionnaires

Hoinville et al (1987) stated that

"A good questionnaire must be designed specifically to suit the study's aims and the nature of its respondents. It needs to have the same properties as a good law and must be clear unambiguous and uniformly workable. It's design must minimise potential errors from correspondents, interviewers and coders."

In this study the construction of the questionnaires was completed after preliminary design work to identify the recipients and general content. The detailed design work was commenced by formulating precise questions based on structured interviews with eight GDP's (four from Lincoln City and four from rural practices) and a listing of possible categories of responses. A cluster sample of GDP's judged to be specifically typical of dental practice in Lincolnshire were interviewed at this stage of the enquiry in order to establish a questionnaire. Care was taken to ensure that the questions posed were designed for ease of understanding for the respondents. The flow structure and length of the questionnaire was designed to encourage and keep the respondents interest. All questions were based on the criteria laid down in the *GDC Guidelines* (1998) and *"Maintaining Standards"* (1999).

The subject of the study and the approach to responders were considered to be primary factors in securing co-operation from the GDP's concerned. In quantifying attitudes and behavioural patterns no distinction was made between attitudinal research (said to have a rather *'soft woolly image'* and behavioural research which enjoys the image of being *"hard rigorous and precise"* (Hoinville et al 1978). In this instance the study included a mix of questions partly presented in a structured manner along with an equal number of qualitative questions. The qualitative questions provided a degree of understanding of the attitudes of the respondents and to allow for the widest possible exploration of views and opinions. Submitting these views for subsequent quantification allowed for the characteristics and attitudes of the groups of opinions to be compared.

All general dental practitioners in Lincolnshire were in receipt of the referral questionnaire. These questionnaires were sent out on 4 May 1999, this can be described as the 'main drop' with no earlier sifting stage since as great a response as possible was required. As the response to the first mailing yielded a response of some 55%, a reminder letter was forwarded to those practitioners who had not responded by 16 June 1999. This reminder had the effect of increasing the total response to some 79% overall thus giving sufficient strength to the study. Further questionnaires were sent to clinical dental practitioners carrying out treatment under GA. Finally, questionnaires (n = 76) were sent to the parents and carers of those children who had been referred by the GDP for a general anaesthetic (hospital or clinic based). The parents in this context, were referred by their GDP's for treatment under GA to the clinician carrying out the treatment and were therefore not subject to the process of selection. The parents and carers questionnaire were two in number, covering the pre- and post-phase of the assessment process.

RESULTS OF REFERRAL QUESTIONNAIRE

The analysis of the questionnaire sent out to all referring GDP's and Community Dental Officers in June 1999 is presented as follows:

Results presented from the referring GDPs and CDOs in N/S Lincolnshire

Table: 1

	GDP	CDO	Other (HDS)	Total
No sent out	143	3	0	146
Nos returned	111	3	0	114
% returned	78%	100%	0	79%

Q1 The effect of the guidelines (1998) on the provision of general anaesthesia
Q2 Provision of GA since the GDC Guidelines

General Anaesthetic	Prior to Guidelines	After Guidelines	Total
Provided	21	2	23
Referred	86	101	187
Neither	7	11	18
Total	114	114	228

$$\chi^2 = 17.79 \quad p < 0.001$$

Q1/Q2: The χ^2 test is examining the relative proportions of the provision of general anaesthesia before and after the guidelines were implemented. A significant result indicates that the provision of general anaesthesia is not independent of the implementation of the guidelines. In other words, the guidelines had an impact on the provision of anaesthesia.

Q3 a) Have the numbers treated for referral changed since the GDC Guidelines?

YES (55) 48.25% $n = 114$ $p = 0.38$

NO (59) 51.25%

The test performed was a test of the Binomial distribution, with a sample size of 114 and probability (under the Null Hypothesis of no change since the Guidelines) of 0.5. Hence, the chance of a 55:59 split where there is an equal probability under the NH gives a p-value of 0.38 – not significantly different. There is no evidence to suggest that the Guidelines had any effect.

b) If YES indicate the numbers per month

	Before Guidelines		After Guidelines	
Treat (ave total)	10.05	553	1.83	101
Refer	3.92	216	3.08	169

$\chi^2 = 102 \qquad p < 0.001$

The χ^2 test here examines the relative proportions of those treated before and after the guidelines (553/769 vs 101/270). A significantly higher proportion of patients were treated before the guidelines than were treated after the guidelines.

Comment:

a) Prior to the guidelines (1998), the majority of dentists in both regions – some 75% - referred their patients for general anaesthesia. Also in both regions about 20% of dentists provided GA.

b) After guidelines had been issued, the proportion of GDPs who referred their patients for GA increased to around 85% and the proportion providing GA fell considerably. In fact, only two dentists (1%) continued to provide GA in Lincolnshire.

c) There was a modest increase in the number of dentists who neither provided GA nor referred patients for GA after guidelines had been produced. (6% - 15%) Even before the GDC guidelines 86 GDPs were already referring for GA and part of the increase in referral is due to the fact that some who were providing GA before the guidelines were now referring. In fact 9 providers had become referrers while 10 former providers now neither provide nor refer. An increase in those who neither provide nor refer is also probably a direct result of the guidelines, particularly as the referring practitioner is now equally liable in the event of a serious incident.

SUMMARY

It may be noted that 55 of the 114 practitioners who replied to the questionnaire stated that there had been considerable change both in the numbers of GAs provided and those which had been referred following the publication of the GDC Guidelines.

In statistical terms, before the guidelines were published, 55 dental practitioners gave a GA to an average of 10.05 patients per month (n=553).

After publication of the Guidelines, the average number of patients treated per month fell to 1.83 (n=101) and referrals fell to an average of 3.08 patients per month (n=169).

It may therefore be stated that the publication of the GDC Guidelines was associated with 452 (81.7%) fewer patients per month being given a GA by the dentist, and 47 (21.8%) fewer patients per month being referred for a GA.

The number of patients per month receiving a GA from their own dentist and referral for a GA fell by 499 (64.9%).

Question 4 If you do not refer for GA any longer please give reasons

Qualitative Analysis – 23 replies (20%)

The general perception among GDP's was that there was no need to refer patients for GA. (8 replies)
Some maintained that since the Guidelines were published, referring a patient for GA was both a stressful and time-consuming operation. (2 replies)
Difficulty was experienced in trying to explain risk to child/parent particularly if the explanation concerned the possibility of mortality. (6 replies)

Question 5 How much is your referral decision influenced by patient preference?

Influence	Before Guidelines	After Guidelines	Total
Considerably	48	38	86
Little	48	55	103
None	18	21	39
Total	114	114	228

$\chi^2 = 1.869 \qquad p = 0.39$

The χ^2 test here examines the relative proportions of the relative proportions of the referral decision being influenced by patient preference, before and after the guidelines. As the p-value is 0.39, there is no evidence to suggest that the implementation of the guidelines changed the influence that patient preference had in the referral decision.

Question 6 As a result of the GDS Guidelines have your views on the need for GA referral changed?

Great Deal: (12) 10.53%

Little: (51) 44.74%

Not at all: (51) 44.74%

No statistical analysis was presented.

These results may reflect the low level of usage of GA in Lincolnshire.

Question 7 What factors do you consider relevant to case selection and suitability for GA?

In the analysis relating to medical history, the 92 who replied considered that anxiety level was the most important factor followed by age and medical history.

Medical history:	78	64.42%
Age:	80	70.18%
Anxiety level:	92	80.70%

The chief factors regarding dental treatment requirement may be divided into three headings.

1) a Difficult extractions
b Multiple extractions
c Total clearance required
d When surgical extraction is deemed necessary eg palatal canines-complicated 8s
e Extractions involve 4 quadrants (including multiple orthodontic extractions)

2) Patient Management

Patients with special needs covering
a Very anxious patients ranging from phobics to uncooperative and difficult children
b Patients who will not accept LA
c Where LA has failed or where there has been the perception of allergy to LA

3) a Patients with infection eg Dental abscess or sepsis
b Where considerable treatment is required to achieve total mouth rehabilitation eg conservative work and exodontias.

Question 8 What steps do you take to avoid repeat referrals?

92 replied to this question

From the analysis of the replies, three factors were clearly indicated

a) The removal of all doubtful (dubious carious) teeth should be carried at one visit if at all possible. (n = 50)

b) Patient education in the young, improving attitudes towards oral health, dietary advice, encouraging the use of fluoride toothpaste, improving communication with patients in order to build up confidence and encourage regular attendance and so reduce the fear of dental treatment. (n = 39)

c) A further factor was that attempts should be made with these patients who wish to have GA to try and direct them either to IV or RA sedation or more commonly to receive LA. (n = 10)

Question 9 What do you consider to be the THREE major potential risks involved in GA?

Qualitative Analysis – Three Risks Stated – (n = 82)

The outstanding factors were presented as follows:

I) Death – an overwhelming majority considered this to be a major risk. (n = 76)

2) Brain Damage – this was considered to be no 2 in the order of importance. (n = 28)

3) Adverse or allergic reaction to the anaesthetic was considered to be the third most important item. (n = 18)

Other risks were perceived to be:

(a) Unknown or unforeseen factors in the medical history
(b) Airway obstruction with the possibility of laryngospasm
(c) Respiratory and cardiac arrest
(d) Inadequate assessment

Question 10 i) Do you explain the potential risks to patients

Yes	91	79.82%	$p < 0.001$
No	23	20.18%	
114		100%	

Here, the Null Hypothesis is that there is no difference in the probability of risks being explained to the patient. Therefore, there should be equal numbers responding YES and NO. Hence, the chance of a 91:23 split where there is an equal probability under the NH gives a p-value of less than 0.001. There are significantly more YES responses than would be expected under the Null Hypothesis of equal probability.

Almost 80% of GDPs replied to this question. 20% who failed to reply may not refer for GA.

ii) What alternatives to GA do you offer? – 19 replied

5 GDPs offered hypnosis
10 GDPs offered sedation (oral and inhalation)

4 GDPs offered a combination of counselling, tender loving care and relaxation therapy. GDPs (114) offered LA as an alternative to GA.

Question 11 Do you have any other views or observations on this area of the Guidelines ie Risks and Alternatives?

Qualitative analysis – Views on risks – 114 replied

Yes	29	25.44%	$p < 0.001$
No	85	74.56%	
	114	100%	

As above, the Null Hypothesis is that there is no difference between the probability of having further views and not having further views. However, the chance of a 29.85 split under the NH of equal probability gives a p-value of less than 0.001. There are significantly more answers of NO than would be expected.

Opinions on this question varied fairly widely.

Some responders thought that more GPs should be encouraged to provide sedation, and would like to see more sedation available locally. However it was perceived that children as a whole might be unsuitable for a sedation technique with the exception of RA. Again most were agreed that hospital departments were not willing to accept GA/sedation patients for conservative treatment with the exception of special needs.

For some, the guidelines were felt to be an over reaction and that a limited number of GA centres must be available locally. It was also felt that in some cases there was no alternative to GA for example, phobics, special needs and the highly anxious. Moreover, some GPs found it inappropriate to discuss risk in terms of mortality with the already nervous patient.

Question 12 What reasons do parents/patients give when requesting GA? - 104 replies

1) *Fear and anxiety of dental treatment were given as reasons for requesting GA – 30 replies.* 29%
2) Fear of needles among patients was given as a second concern (giving rise to refusal for LA). – 19 replies. 18%

3) 2 responders reported the desire of patients to be asleep, so that they did not know "what was happening" to them. 2%

Remaining questions for requesting GA varied widely and included:-

(a) Parents wishing to avoid a bad experience for the child.
(b) Some parents felt that GA was appropriate for very young children.
(c) Some parents felt that local anaesthesia might put children off dental treatment.
(e) A few stated that GA was easier and less stressful for the child patient.

Question 13 Do you always undertake a full medical assessment of patients when you refer for GA?

Yes	101	88.0%
Did not reply	13	11.4%
	114	100%

From the figures quoted in questions 8 and 11 the majority of GPs would appear to undertake full medical assessment of patients when referring for GA but do not explain the risks. This may be a matter of concern with regard to Clinical Governance. It may be that the 13 GPs (11.4%) who did not reply to this question did not refer.

Question 14 Do you use a standardised referral letter?

Yes	51	44.74%
No	63	55.26%
	114	100%

SEDATION

Question 15 Do you carry out sedation in your practice?

In line with the Poswillo report of 1990 chapter 4, namely that sedation should be used in preference to general anaesthesia whenever possible, the following questions were put to all GDPs:

Do you carry out sedation in your practice?

Yes	20	17.54%
No	91	79.82%
Neither	3	2.63%

From these figures only 20% of the total number of GDPs who replied offered sedation per se. However, this compares with 7% of GDPs in a previous survey in 1996 (Middlemass 1996).

While there has been an increase in the number of GDPs offering sedation in line with the Poswillo recommendations this increase has been small. This may be due to increased surgery time and the generally poor NHS fee scale for sedation at the present time.

Question 16 If yes how many per month?

Children under 16	0.9 (18 in total)
Adults	0.65 (13 in total)

These represent the total number of patients treated by sedation by all 20 GDPs

As 20 GDPs stated that they carried out sedation in their practice and averaged 0.90/month then a total of approximately 18 children are treated by sedation on a monthly basis, with approximately 13 adults treated on a monthly basis.

Question 17 Indicate which of the following types of sedation you provide.

16 GDPs (16.3%) provided IV sedation in their practices while 4 practitioners (3.51%) provided RA.

94 GDPs did not provide sedation.

Question 18 Do you refer cases for sedation?

Yes	*49*	*42.98%*
No	*58*	*50.88%*
Neither	*7*	*6.19%*

Nearly 50% of all GDPs replying to this question referred at times for sedation, and there would thus appear to be a change of attitude in line with the original Poswillo recommendations.

However, bearing in mind the Poswillo recommendation namely "sedation be used in preference to GA whenever possible" it may be said that these figures are disappointing. Low returns in the number of GDPs practising a sedation technique may be due to increased surgery time involved and the poor NHS fee structure in place at the present time. While 2 GDPs stated that sedation helps some difficult patients, the consensus of opinion was that sedation (like GA) did not turn a bad patient into a good one.

Question 19 i) If yes how many per month?

Children – approximately 23 (0.46)
Adults – approximately 27 (0.54)

ii) Where are cases for sedation referred?

The response to this question was as follows:-

44 Dental Practitioners replied to the question specifying 11 referral centres. Of the total number, 41% specified the Dental Anaesthetic Clinic at Long Eaton.

As 42 GDP's referred patients for sedation to a wide selection of locations not only in Lincolnshire, but to varying other counties (albeit in very low number), there would appear to be a need for the centralisation of sedation services along with training and support services for those wishing to treat and refer patients requiring a sedation procedure.

Question 20 What reasons would you give for referring patients for sedation?

Replied	Yes	58	50.88%
Did not reply	No	56	49.12%
		114	100%

Qualitative Analysis – 58 replied to this question

(a) 27 responders stated that the very anxious or phobic patient was the reason for referral for sedation.
(b) Refusal to have local anaesthesia as well as failures of local anaesthesia accounted for a further 10 responses.
(c) Fear of general anaesthesia plus the risk factors relating to GA accounted for a further 21 responses.

Other factors quoted were:

1) ***Safer than GA***
2) ***Suitable for those patients who were difficult to treat as well as those requiring long clinical procedures or where no other method of pain and anxiety control was possible.***

Question 21 Would your practice supply sedation if resources were made available?

Yes	25	21.93%)	
		)	of those who replied
No	89	78.07%)	
No Response	28	29.66%	of number sent out

Question 22 If yes indicate the nature of those resources that you would require – 25 replied to this question

Funding for the purchase of equipment (in accordance with the guidelines) plus postgraduate training courses for dentists and dental nurses was deemed by far the most important issue for those who responded to this question..

25 responders stated that the NHS fees for treatment carried out with sedation were quite inadequate particularly when a prolonged procedure was being carried out. The amount of surgery time involved was deemed an important factor.

While there was some support for resources to be made available for sedation, it should be noted that the number of patients treated was very low and supporting too many dentists in the field of sedation would be unlikely to enhance the service or improve skill levels. There may be a role for the CDS (now salaried dental services) in the form of pain and anxiety control centres. One such clinic in Boston Lincolnshire now operates a sedation service on referral one day per week (on average 6 patients per day).

Question 23 What are your personal views on the GDC guidelines?

Almost a quarter of those practitioners whose personal views were canvassed on this question did not reply. Of the 77% (n=88) who did reply, 47 (41%) were generally hostile to the guidelines. Opinions varied widely and while 36% (n=41) of the replies were generally in favour of the guidelines, there was almost unanimous agreement that GA should continue in some form or another, if not within the hospital scenario, then in specialised centres where DGA could be safely carried out. Complaints regarding the guidelines were along two channels. (i) Comments such as "the guidelines were over the top", "a knee-jerk reaction in response to political pressure", "too restrictive and ill thought out with regard to the future of GA". (ii) Lack of

suitable centres for the administration of GA for those patients (mainly for children who still required it) and disillusionment with the lack of hospital facilities plus a deep concern about the waiting period to obtain a GA and the distances some patients were obliged to travel to obtain this service. There was also anger from most practitioners who had made a heavy financial investment in the equipment necessary to bring their practices up to the standard required by the Poswillo recommendations – this being in line with an increased use for GA as smaller providers were phased out. In summary, many practitioners felt that they had had GDC legislation imposed upon them without prior consultation, giving many deep concern for the treatment needs of their patients, particularly as few hospitals had the necessary facilities to cope with the increased demand for general dental anaesthesia.

Question 24 i) Should GA for dentistry only take place in hospital?

Replied

Yes	69	60.53%
No	45	39.47%
	114	100%

ii) Percentage of those who made comment

Yes	49	42.98%
No	65	57.02%
	114	100%

6 comments were in favour of GA services in hospital and were satisfied with the guidelines.

43 replies were generally in disagreement with the guidelines. Some of the responders opinions varied widely however, 17 of whom considered that the setting of specialist GA centres for quick referral access was extremely important to cope with local need particularly for that section of the population for whom there was at present no alternative to GA.

There were complaints from 6 responders regarding the long waiting time following a GA referral to the Boston Pilgrim Hospital and Lincoln County Hospital (at present 6-8 weeks).

There were complaints of long distances to travel – some patients having to travel outside the county to obtain treatment (8 replies). Other replies (6) felt that the general loss of GA facilities had given rise to an incomplete service to patients and that an important tool in the dentist's armamantarium had been removed.

There was concern among some replies (4) that the guidelines represented a high handed approach by members of the GDC who had made a vital pronouncement

without putting alternative arrangements in place and thus denying a service to a small but highly significant section of the population.

The perception of the majority of GDPs was that specialist centres for GA referral should be provided either in hospital or dedicated establishments where facilities would be available in accordance with the GDC guidelines of November 1998.

Conclusion: It was considered preferable to organise responses to the questionnaire mainly in narrative and augmented with tables.

QUESTIONNAIRE SENT TO ALL DENTISTS CARRYING OUT CLINICAL PROCEDURES UNDER GENERAL ANAESTHESIA

For the purpose of the survey three community dental officers interviewed a total of 76 patients/parents in order to establish a format for a patient questionnaire. The three community dental officers concerned were the only dental surgeons carrying out treatment under GA. A Patient Pre-Assessment Questionnaire (Appendix 3) and a Post-Assessment Questionnaire (Appendix 4) were delivered to the co-operating treatment dentists at the commencement of the study. These questionnaires were given to the parents/carers by the treating dentists for completion at the pre-assessment stage, which was prior to surgery and at the post-assessment stage (after surgery). Both questionnaires were retained by the treating dentists until the end of the study when they were then forwarded to the investigator. This was to facilitate the audit process of the parents/patients perceptions of the effect of the availability of the GA process plus experience of the referral process. Analysis of the results considered that 60 referrals followed the criteria laid down by the 1998 guidelines. 18 referrals however, did not give clear or concise reasons for the administration of a GA, thus indicating that some of the criteria from the referring dentist did not fully reflect the GDC guidelines. It was also established that there was scope for improvement in the way in which medical histories were taken. In the majority of cases 79% (n=62) the treating clinician presented alternative methods of treatment during the assessment process. In 21% of cases (n=16) the operating clinicians considered that there were no alternatives to GA. In all cases the dentist carrying out the clinical procedures gave a clear explanation of the possible risks involved with GA. The requirement to explain alternative forms of treatment generally complied with the GDC guidance. In all cases the operating clinician was satisfied that the selected method of treatment – namely GA – was clinically necessary. Doubtful teeth in nearly every case, were checked to avoid repeat anaesthetic with radiographs normally undertaken. In all cases, patients/parents were satisfied with the treatment plan offered by the operating dentist.

One quarter of those who were referred for GA (n=18) had received GA for extraction of teeth in the past or had a familial history of dental treatment under GA. The results of the survey indicate that most patients would have a problem if GA were not available (75% n=57). This would appear to show that a cultural influence on the demand for GA existed. Under these circumstances, GDPs may have a problem in persuading these patients to accept alternative forms of treatment even in low demand areas such as Lincolnshire. With family members accustomed to repeat general anaesthetics, there may be a psychological conflict between need and demand. It may also be said that those patients who have been used to GA may have a problem when contemplating an alternative method of treatment if GA were to be completely withdrawn. (75% n=57) For a significant section of the public managing a residual need for GA will be a challenge for the profession and the appropriate purchasing authorities who will be charged with both monitoring standards and compliance with the GDC Guidelines in the coming years.

In conclusion, the results presented are the numbers of each response recorded on the returned questionnaires.

RESULTS OF REFERRAL QUESTIONNAIRE SENT TO ALL DENTISTS CARRYING OUT CLINICAL PROCEDURES UNDER GENERAL ANAESTHESIA

Referrals from 78 GDPs were considered.

The Referral

1. Were you satisfied that the referral letter followed the criteria laid down by the GDC Guidelines of November 1998 and that the reasons for GA were clear and concise (ie full justification for GA)

Yes	***60***	***76.92%***
No	***18***	***23.08%***
	78	***100%***

Almost 77% of GDP's referring patients for GA considered that the reasons for the administration of a general anaesthetic were clear and concise and in full accordance with the Nov 98 GDC guidelines. Of the 78 patients screened, 18 were not justified in receiving a GA in the considered opinion of the dentist carrying out the clinical procedure.

2. Were you satisfied that a full medical and dental history had been undertaken by the referring dentist?

Yes	60	76.92%
No	18	23.08%
	78	100%

While 60 responders (77%) stated that they were, in general, satisfied with the manner ***in which the patients medical/dental history had been taken, there would appear to be room for improvement in the manner in which the medical and dental history was recorded***
(unsatisfied n = 18)

3. Did you establish that written consent had been obtained?

Yes	58	74.36%
No	20	25.64%

4. Do you keep a record of the assessment process?

Yes	78	100%
No	0	0%

Records were kept by both referring and clinical dentists.

	78	100%

5. Were alternative methods of treatment considered during the assessment process?

Yes	62	79.49%
No	16	20.51%
	78	100%

79% (62) of the referring practitioners stated that they considered alternative methods of treatment during the referral process. 21% of the referring dentists may have considered that there was no alternative to GA.

6. Did you give a clear explanation of the risks involved (and the possible alternatives to GA)?

Yes	77	98.72%
No	1	1.28%
	78	100%

All bar one of the referring dentists stated that they gave a clear explanation of the potential risks involved in GA.

7. What alternatives to GA were discussed with the patient?

LA	59	75.64%
RA	2	2.56%
IV	4	5.13%
None	13	16.67%
	78	100%

Of the alternatives offered to patients LA was considered to be the alternative treatment of choice (59). It must be assumed that in 13 cases no alternative to GA was considered.

8. If GA was the selected method of treatment were you satisfied that GA was clinically necessary?

Yes	72	92.31%
No	6	7.6%
	78	

100%

92% (72 replies) considered GA to be the treatment of choice – that is clinically necessary. This may lend colour to the belief that GA is still clinically necessary in certain cases and as such should be retained in the dentists' armamentarium.

9. Were methods of pain and anxiety control stated?

Yes	49	62.82%
No	29	37.18%
	78	100%

10. Were doubtful teeth checked to avoid a repeat anaesthetic?

Yes	77	98.72%
No	1	1.28%
	78	100%

Almost all the referring GDP's prior to referral for GA checked doubtful/dubious teeth with a view to avoiding a repeat anaesthetic.

11. Did you think that the patient/parent was satisfied with the treatment plan?

Yes	78	100%
No	0	0%
	78	100%

It would appear that all patients/parents were satisfied with the treatment plan offered.

12. Comments

Yes	11	14.10%
No	67	85.90%
	78	100%

4 replies considered that GA was preferable where extractions were required in all 4 quadrants.

Questionnaires were administered to patients before and after the assessment process. These were completed by 76 parents/carers.

Analysis of the returns prior to the assessment process. This was completed by 76 parents/carers.

1. Are you replying on your own behalf or on behalf of the child?

Own	11	14.47%
Child	65	85.53%
	76	100%

2. Have you/your child had a previous general anaesthetic (gas)?

Yes	32	42.11%
No	44	57.89%
	76	100%

Almost half of the parents/children questioned had experienced a GA. This may have lent colour to the decision of those who had already experienced a GA to opt for the same method of treatment.

3. If YES was it for tooth removal or operation in hospital?

Tooth removal	25	78%
Hospital	7	22%

4. Is it common practice in your family to have GA for tooth removal?

Yes	20	26.32%
No	53	69.74%
No reply	3	3.9%
	76	100%

It may be there is a social/cultural influence here.

5. Have you/your child felt poorly after tooth removal under GA in the past?

Yes	4	5.28%
No	62	81.58%
No reply	10	13.16%
	76	100%

As only 4 (5.28%) responders replied positively to this question, it may be taken that this fact was not of any great importance to those who responded in the negative. (n = 62)

6. Was the choice of GA?

Your own/child	27	33.53%
That of the family dentist	42	55.26%
None stated	7	9.21%
	76	100%

It would appear from these results that the family dentist had a significantly greater influence on the choice of GA as the preferred method of treatment.

7. Have you/your child been offered anything else instead of GA?

Yes	38	50%
No	33	42.42%
None stated	5	6.58%
	76	100%

Rather curiously 42% of the patients assessed were offered no alternative to GA at this stage. It may be that those who opted for GA were not prepared to tolerate any other alternative. It may also be that the referring dentist may have considered that for the treatment concerned there was no alternative to GA.

8. If YES what were you offered?

For those who replied positively to this question:

LA	33
Sedation	3
No reply	40

9. Would you/your child have treatment by local anaesthesia if GA was not available?

Yes	34	44.74%
No	37	48.68%
Not stated	5	6.58%

As almost 50% of the replies to this question were in the negative, it would appear to indicate that for quite a large number of patients GA is still the acceptable method of dental treatment for exodontia.

10. How important is having a general anaesthetic to you/your child?

Very	39	51.32%
Quite	24	31.58%
Not at all	13	13%

As implied in the reply to the previous question GA was an important method of treatment in more than 50% of the replies to the question as well as the 32% who considered this form of treatment to be quite important.

11. Have you received any advice regarding the possible risks associated with GA?

Yes	32	42.11%
No	41	53.95%
Not stated	3	3.95%

As 54% of replies did not receive any advice on the possible risk associated with GA it may be that the referring dentist did not wish to go into great detail regarding risk (particularly mortality) considering this to be the prerogative of the clinical dentist.

12. What advice was received with regard to GA

COMMENTS

Checked medical history – post-op care	20/76
No food or drink 6 hours before GA	20/76
Risk of possible sickness and dizziness after GA	2/76
Always slight risk with GA	20/76

Informed what the procedure would be	20/76
Possible risk from anaesthetic	20/76
Asked if any health problems	20/76

Apart from checking up on medical history 42% of all patients received some advice on the possible risks associated with GA although this would appear to be of a relatively non-specific nature. This seems to indicate that no referring dentist is willing to discuss or talk to patients on the question of possible mortality.

14. Will having tooth removal be more difficult for you/your child if GA was no longer available?

Yes	57	75%
No	14	18.4%
Not stated	5	6.5%

As a significant 75% answered positively to the question above it would appear that there is some cultural mind set with regard to GA and a sizeable number of patients (parents) will continue to opt for this form of treatment.

PATIENT POST ASSESSMENT QUESTIONNAIRE

Analysis of returns to the post assessment questionnaire completed by 73 patients/parents.

1 Were the alternative methods of treatment and their relative risks explained in an understandable way?

Yes	69	94.52%
No	4	5.48%
	73	100%

There would appear to be good compliance with the GDC guidelines on the part of the clinical dental practitioners.

2. What method of treatment was chosen?

LA	1	1.37%
Sedation	0	0%
GA	69	94.52%
No response	3	2.74%
	73	100%

It would appear from the results given above, that those patients who had been referred for GA overwhelmingly accepted this method of treatment as the treatment choice.

3. Were you/your child happy with the method chosen?

Yes	71	97.2%
No	2	2.8%
	73	100%

4. Do you feel that you/your child views were taken into account in deciding the method of treatment?

Yes	72	98.63%
No	1	1.37%
None	0	0
	73	100%

Chapter X

Discussion

The response rate from referring dental practitioners was 78% (n=114) in Lincolnshire. While 76/73 patients/parents responded to the pre/post assessment questionnaire thus giving, it is considered, sufficient strength to the study and allowing certain important criteria to be established.

The most important indicators from the survey were:-

- There is a small but still significant need for dental GA in Lincolnshire. The element of need still exists for very young children and those patients who have a chronic fear of dental treatment – confirmed phobics, the highly anxious and those who insist on being 'asleep' during treatment.

- It was originally hoped that there would be significant reduction in GA administration following the Poswillo Report of 1990 and that there would be a corresponding rise in the numbers of patients in receipt of sedation. While the number of GA's has shown a marked decline there has been comparatively little movement towards the use of sedation techniques as an alternative method of anxiety and pain control. This may be due to the lack of time, training and appropriate facilities on the part of the average GDP and also the low fee structure for sedation at present prevailing within the NHS. Further it may be that LA is finally becoming increasingly more acceptable. Analysis of GDP's views also indicates that the lack of patients suitable for sedation was another consideration. The Poswillo Report made clear in its recommendations that sedation together with LA should be the method of treatment in the future as an alternative to GA – this particular aspect being given further impetus by the recent Guidelines from the GDC (1998) and the CMO's Report (2000) – the latest in a series of reports dating from 1964.

- Only 17% of GDP's (n=20) actually carried out sedation in practice.

- The number of sedation treatments administered per GDP was very small. 20 GDP's administered a total of 30 treatments by sedation per month for children and adults.

- 44% of GDP's (n=50) referred for sedation but due to the lack of referral centres and the size and rural nature of Lincolnshire patients had to wait a considerable time for treatment by GA or, if referred for sedation were obliged to travel long distances outside the County in order to obtain such treatment.

- 22% (n=25) of GDP's indicated that they would (or might) provide a sedation service if resources were made available. It is relevant here to indicate that the majority of GDP's are aware of the potential risks attached to sedation and that it is incumbent on anyone who practices sedation to ensure that they are adequately trained to provide this form of treatment for their patients and in this respect sedation is no different from GA.

It would appear from the overall results that sedation as practised in the dental surgery has not taken hold in the way that Poswillo intended, even the possibility of resources for sedation being made available elicited little response. It is perhaps interesting to record that of the comparatively recent graduates (1984-1989) only 3 carried out sedation in general practice, while 35 expressed no interest in resources being made available. However, all results in this analysis are relative with changing attitudes in the United Kingdom regarding NHS and private practice. Until the new dental contract due in April 2006 becomes extant, the question of the practice of sedation as a means of anxiety and pain control will have to remain in the balance.

Dionne (1998) established that fear persists despite continuing improvements in dental therapy and pain control modalities. Many patients are highly aversive to the most common methods of blocking pain during dental procedures namely LA on account of perceived pain associated with intra-oral needle puncture. As a result fear discourages people from seeking often much needed dental care. Lindsay (1993) indicated that approximately 25% of all adults are highly apprehensive of dentistry some being so terrified as being classified as phobics. This may force patients to avoid visits to a dental practitioner and only attend when circumstances are desperate. This avoidance can have an adverse effect on an individual's oral health status and also reduce the quality of lifestyle possibly curtailing their social relations with other people. Only 42 out of every 100 adults and 62 children out of every 100 were registered with a GDS dentist BDA News (1999). While it is unlikely that half the adult population is phobic about dental attendance, it is important that if this half of the population is to be encompassed within the regime of general dental care, then for those requiring extensive treatment alternative methods of pain control other than GA (or even GA) should be considered in order to attract such patients to visit a dental practitioner. It is therefore incumbent on the dental profession to find ways of overcoming the problems relating to fear and anxiety by considering the use of such alternatives to GA as are available. The use of sedation as a serious alternative to GA was endorsed by the GDC 1998 as a serious alternative to GA. In effect the GDC Guidelines should compel dentists to look at and consider all the options relating to pain and anxiety control. It may well be that in the past GA was an easy option compared to other methods of pain control. However the recent changes to the guidance presented by the GDC in 1998 means that dental GA will become less readily available for children and those adults for whom there is no alternative form of treatment. Preventing disease is always a priority, but in terms of treatment it would be unfortunate if improvements in safety also had the effect of putting care further out of reach of those children and adults who are already disadvantaged. Future development of GA services requires a particular understanding of those who need to use them.

There are major concerns that the recent sensible move away from the need to administer GA as part of dental training in addition to the culture change away from prescribing GA, may lead to a situation in which training and experience in GA administration will disappear from undergraduate dental education; this could lead to the development of a situation where dental practitioners are ignorant of:

a) GA administration
b) The value of GA for certain patients

c) The importance of GA in dealing with certain clinical situations (Rood 1999).
It remains important to include in the undergraduate course all those aspects of GA training described by the GDC in the *"First Five Years"*. Only in this clinical setting will dentists have first hand experience of the advantages of GA for certain patients and only with exposure to patients treated under GA will younger dentists witness and gain experience in cases of patients who are unconscious and during recovery (Rood 1999). Future problems may relate to those who administer the anaesthetics.

In previous years dentists, GP doctors as well as some consultant anaesthetists administered what was known as a "dental anaesthetic". Anaesthetists trained in the current decade provide anaesthetics in a manner in which they feel secure which is generally more time consuming and resulting in fewer patients being treated and an increase in surgery time. At the present time dental anaesthesia is very much in the media and government spotlight. While the progress towards a hospital-based provision is now inevitable the following points should be made.

a) Children require GA as they are often unable to cope or co-operate with sedation or LA techniques.

b) Psychological trauma to children and carers is less with community-based procedures than with hospital-based procedures.

c) A community-based service is cheaper to implement than most currently existing hospital operating theatre sessions.

d) Enough resources do not exist to easily transfer all cases to a hospital setting thus leading to "rationing".

e) There may be a lack of direct supervision for trainee anaesthetists in the hospital environment particularly as some dental lists may be isolated operating theatre lists (Patel 2000).

Dental GA provision, particularly the referral process, has been in a state of rapid transition since November 1998. The GDC placed specific responsibilities on dentists both at the referral stage and those operating in GA centres where informed consent required an understanding of the alternatives and the risks. Much of the discussion and research in this area of dentistry has focussed on clinical decision making for the referral process itself. The rapid introduction of the new GDC guidelines raised further problems with regard to sedation. In particular this relates to the dental profession being universally unprepared for the provision of appropriate sedation techniques. There is the potential for many practices previously providing GA to decide to offer sedation, but if this is not provided to a high standard there could be new problems and criticism of sedation in relation to dentistry. The answer may be to arrange a system of formal assessment and approval of control or regulation which, while likely to be unpopular, is essential to ensure high standards and safe practice. Without some form of regulation, inappropriate methods of sedation may be practiced. At the time of the present survey (1999-2000) few dental schools taught sedation. The situation (2006) has, however, changed. In order to up-date the information relating to the current teaching of dental students in sedation procedures,

the following comments are presented. In order to ascertain what was happening throughout dental schools in the UK with regard to under-graduate teaching, a questionnaire was designed and circulated to 14 dental school representatives under the umberella of the Dental Teachers Sedation Group (DTSG). Analysis of the returned data showed that most under-graduates (UG's) obtained experience in their 4th and 5th years for both inhalation sedation (IS) and intravenous sedation (IVS) although some schools did not offer UG's access to IS in children. The extent of exposure for UG's to IVS was greater than IS with 13 schools confirming this. In conclusion, all schools were providing access to experience in IVS; however, the picture regarding access for IS was patchy. Further, it was deemed essential that there be longditudinal clinical pathways so that students could take a patient from the assessment stage to the final outcome and that sedation be demystified so that it was as common as giving a local anaesthetic.

The revised GDC guidelines of 1998 made clear that alternative treatments must be available when GA is discontinued in general dental practice. The immediate goals would appear to be:-

a) accept a culture change (less reliance on GA)
b) raise the profile of sedation at undergraduate level
c) ensure that in future dental education a knowledge and experience of GA is maintained

With regard to the future of GA for those patients who still require this particular treatment, adequate resources will be required to set up specialist units in hospitals to provide a GA service for dental patients. Not all patients can be treated successfully under sedation and these patients have to be treated somewhere.

As GDS GA services terminated at the end of 2001 the inevitability of a hospital-based provision resulted. This situation has now led to longer waiting lists with fewer patients being treated per session thus escalating the cost of treatment per patient. From many communications to professional journals and from dental practitioners closely involved in the administration of GA services, the consensus of opinion is that the GDC guidelines of 1998 were both hurried and ill conceived. The rationale of the Poswillo Report of 1990 was to wean patients and dentists away from the concept of GA and towards sedation techniques and specialist centres for the administration of dental GA. In the event a number of specialist GA clinics expanded throughout the country culminating in the tragic happenings within the year 1998 possibly due to a lack of professional regulation which was in keeping with the non-implementation of one of the Poswillo recommendations.

With regard to a purely hospital-based service, Section 4-13 para 3 of the GDC guidelines 1998 indicates that

"providers of dental GA in hospital must have protocols that include the immediate transfer of a patient to a critical care facility should circumstances arise that necessitate such a course of action"

If critical care is taken to mean the facilities of a district general hospital then it is extremely unlikely that a director of an anaesthetic department will agree to a request that an ITU bed is kept purely for a possible dental emergency. Regarding the GDC guidelines it might have been more suitable to phase out GA in general practice over a specified period of time replacing it with suitable sedation facilities and allowing time for an adequate hospital-based anaesthetic service to develop (Willetts 2000).

The consensus of opinion of recent times is that previous numbers of paediatric anaesthetics administered in general practice might not have been solely clinical or necessity driven. This may also be interpreted as meaning that a need was no longer being met due to difficulty in finding hospital facilities that provided conservative as well as exodontia treatment for children under GA and that problems might be stored up for the future (Wraith 2001).

There is still concern with the definition of "hospital setting" as the most strict definition would mean that many hospital-based day surgery units would have to close down while a loose term would mean that a number of dental clinics would still be able to provide dental treatment under GA.

Chapter XI

SEDATION

"Dentists have a duty to provide and patients have the right to expect adequate and appropriate pain and anxiety control" (GDC 2000).

Conscious sedation is a fundamental part of this process since patients need and expect appropriate pain and anxiety control for any dental procedure. (Standards in Conscious Sedation 2000) Conscious sedation is a field of dentistry that has attracted an increasing amount of attention in recent years dating back to the publication of the Poswillo Report in 1990. This report added weight to the demand for post-graduate education in the subject of conscious sedation. The report stated that

"those who wish to practice sedation (Intravenous and inhalational) should have attended a recognised course" (Poswillo 1990).

Recommendations of the Poswillo Report were followed in 1993 by a Report from the Royal College of Surgeons which issued a proposal outlining details of such courses as might appertain to all non-anaesthetists (medical and dental) who wish to practice sedation. The CSAG Report in 1995 recommended higher standards in the treatment of patients and further emphasis on safer techniques and training for dentists, anaesthetists and supporting staff. It was also during 1975 that the Society for the Advancement of Anaesthesia in Dentistry (SAAD) and the Association of Dental Anaesthetists (ADA) issued specific guidelines in relation to contemporary clinical practice with regard to both GA and conscious sedation. (Standards in conscious sedation 2000) The guidelines with relation to SAAD referred to the physiological monitoring of patients during dental anaesthesia or sedation. Similar guidelines relating to the monitoring of patients during anaesthesia or sedation were put forward by ADA. In 1998 the GDC recognised the views of the specialist societies (SAAD and ADA) and the relevant Royal Colleges. The need for conscious sedation was endorsed rather than the continuing provision of GA as a demand led service. This would seem to have the effect of reducing the use of GA in Primary Dental Care. With the use of GA thus severely restricted the use of alternative methods of pain and anxiety control has become essential.

Sedation per se, probably commenced in earnest in the mid to late 50's with such methods as the Jorgensen technique and intravenous brietal. It was always understood that patients maintained their own airway, but airway management was taught just in case! Sedation alters the perceptual consciousness of the patient and their ability to fully comprehend the situation. If sedation is not a step along the way to total oblivion, the elements of perceptual consciousness may be summarised as follows:

i) awareness of external objects

ii) it is intuitive

iii) it may be erroneous

iv) it clouds issues of judgement

GA on the other hand seeks to make a patient totally unconscious, so that a particular procedure can be carried out. Sedation is carried out to overcome a patient's concerns about dental care, and demonstrate that it can be pain and anxiety free.

Why on occasions does sedation fail?

i) incorrect assessment

ii) unrealistic expectations

iii) poor treatment planning

iv) poor LA

v) poor technique

If failure is due to management error

i) do not proceed further

ii) consider alternative sedation technique or GA

It has been demonstrated that sedation techniques are of great benefit to patients in a range of clinical circumstances and it is important that these techniques remain available in general dental practice. Much can be done to enhance patient care if good facilities for conscious sedation are more widely available.

A key factor in the administration of sedation is the importance of maintaining a wide margin of safety between conscious sedation and the unconscious state of GA when vital communication with the patient or protective reflexes are lost. The definition of conscious sedation has been adjusted in that it is dentistry specific and the GDC has now adopted the term *"conscious sedation"* rather than simple sedation or dental sedation (Standards in Conscious Sedation 2000).

Conscious sedation fulfils the public preference for a method that allows wakefulness and insensibility to pain. As an anaesthetic approach conscious sedation alleviates patients' pain and anxiety while safeguarding their particular reflexes and vital functions. Conscious sedation allows patients to undergo procedures that they would otherwise be unable to tolerate. However, conscious sedation must not in any way contribute to the risk of mortality or morbidity to the procedure and ideally should be safe when used by dental surgeons and anaesthetists.

Where conscious sedation is concerned there is a need for careful and effective case selection and it is important not to allow the use of conscious sedation to escalate or be used without good clinical justification. There should be no tacit assumption that if conscious sedation is required on one occasion it will be needed time after time.
It should be further borne in mind that two deaths associated with conscious sedation techniques occurred in the second half of the 1980's and may be an indication of the increasing substitution of conscious sedation for GA (Coplans and Curson 1993).

The impact of the GDC's new guidance on GA should compel GDP's to consider all the options of pain and anxiety control before referring a patient for GA. Until recent times it has been easy to ignore conscious sedation (as well as other methods of anxiety control) and go for the simple option of GA for those patients who are not able or willing to accept dental treatment under LA alone. However, as has been mentioned elsewhere, it is incumbent on anyone who practices dentistry to ensure that they are adequately trained to provide the treatments they offer to their patients and in this respect conscious sedation is no different from GA or any other treatment procedure. The recent GDC revised Guidelines relating to GA make provision in general dental practice very difficult and many in the profession believe that the introduction was too hasty. The decisions made by the GDC were designed to stop indiscriminate use of GA and to move to other methods of patient management thus realising a need for the so-called 'culture change' (Strunin 1999). This culture change can greatly help the cause for keeping conscious sedation within dentistry providing sufficient evidence can be produced of the need.

If the predicted increase in referrals for treatment under conscious sedation does come about, some issues must be addressed urgently.

i) Those dentists who wish to practice conscious sedation must receive appropriate training in both the theoretical and practical aspects of modern conscious sedation techniques. In this respect, post-graduate educational institutions and regional deaneries need to ensure that those dentists with an interest in conscious sedation have the opportunity to receive formal training in the subject.

ii) There should be a re-emphasis of conscious sedation education in the dental under-graduate curriculum. It is essential that the theoretical and 'hands-on' practical training in inhalational and IV techniques become the norm in every dental school.

iii) A proper infrastructure will be required if the predicted 'culture change' from GA to sedation is to be safe and effective.

iv) With the expected increase in patients requiring and also dentists requesting conscious sedation training, additional demands will be manifest. The DoH should redirect capital which was previously used to fund GA in general dental practice, not only into specialist centres for dental GA but also into service provision and educational programmes in conscious sedation (Girdler 1999).

It is ironic that conscious sedation teaching at under-graduate level seems to have been afforded a low priority by many dental schools particularly at a time when the clinical demand for conscious sedation is predicted to increase. Action must lie with the individual dental schools and dental regulatory bodies to develop conscious sedation education in the under-graduate dental curriculum. However, it should be noted that in the "First Five Years" 2nd Edition published August 2000 reference is made in paragraphs 104 and 105 on the need for all dental students to have a range of practical experience in the admission of inhalational and intravenous conscious

sedation including assessment and preparation of patients. Further it is also stated that the theoretical principals of GA should be taught to students and they should have this knowledge reinforced by attending GA sessions conducted by a consultant anaesthetist who is administering GA to dental patients. Practical experience should begin in operating on patients under GA and this should also include management of the airway.

A further aspect relating to conscious sedation should also be mentioned here. Fees for conscious sedation in the NHS need to be reviewed with some urgency, and increased substantially. The operator/sedationist fee does not reflect the need to ensure safe delivery of conscious sedation. Fees must also reflect the cost of appropriate drugs, adequate monitoring, training of support staff and recovery facilities. Additionally, supervision, assessment, modern and well-maintained equipment, and the cost of basic and continuing training is of paramount importance (BDA GDS Committee October 1998).

On the subject of consent to conscious sedation, the GDC requires the written signature on a consent form which does not replace necessity for the correct communication process leading the patient to a clear understanding of the treatment to be provided and the possible complications and any alternatives to it. A further aspect is the patient's authority, namely whether the patient is over 16 years and whether the patient has the capacity to give consent. It should be stated here that the appropriate use of sedation techniques has been advocated and encouraged in a series of expert working party reports from Wiley in 1978 to the RCS Working Party Report to the Royal College of Anaesthetists in 1999.

During the same period the GDC has updated its ethical guidance in relation to the practice of conscious sedation in several reviews. The GDC Education Committee has also required that clinical conscious sedation techniques be taught to undergraduates. However a series of less than satisfactory dental school visitation reports have highlighted deficiencies in the provision of such undergraduate education (Rood 1999).

Unlike many procedures in dentistry conscious sedation has the potential for serious morbidity or even mortality and while the profession has a good safety record, court cases have shown that it is not possible to entirely eradicate either the cavalier operator/sedationist or the incompetent anaesthetist (Holden 1999). It should be recorded here that maximum safe doses of a sedative drug do not necessarily lead to safe conscious sedation. A minimal dose of an IV sedation agent might not sedate many patients but it could anaesthetise a few. Put another way the same drugs and dosages applied to different patients can have different effects. Further, dentists have a duty to administer conscious sedation only within their limits of knowledge, training, skills and experience.

Safety is paramount for any conscious sedation technique. It is widely accepted that conscious sedation is safer than general anaesthesia. However, a poorly controlled conscious sedation technique may result in deep sedation or general anaesthesia with all its attendant risks. Unintended loss of consciousness may be potentially more risky than general anaesthesia. The sedationist must be able to exert a fine control over level of sedation. The margin of safety between sedation and anaesthesia must

be wide enough to prevent unintended loss of consciousness occurring. The current gold standard of postgraduate training for conscious sedation is the Diploma in Conscious Sedation. This equips dentists well to deliver RA to children and intravenous Midazolam to adults. Children requiring more complex techniques involving combinations of drugs for effective sedation should be treated in specialist centres with appropriately trained and experienced teams. It is appropriate that these centres operate in a 'non hospital setting' (Averley et al 2004).

While the number of GA's administered in general dental practice is now minimal, the number of cases where conscious sedation has been administered has remained steady and has not increased in the way that was anticipated. This may raise the question of whether all the GA's previously administered were actually clinically necessary or whether there is a genuine unmet need for treatment following on from the publication of the Poswillo Report (Fung et al 2000). It is possible that the success of GA services has been a deterrent from developing effective preventive restorative and conscious sedation services (Hosey 2001).

With regard to sedation techniques as applied to children, the only mainstream technique that is taught is relative analgesia (RA) which is essentially nitrous oxide plus oxygen in small controlled amounts, producing a generally light, pleasant sedation. Verbal contact is retained and the child recovers completely afterwards. However, RA requires co-operation from the patient, which may not always be forthcoming with children. For adults, as well as RA, the IV route via the sedation drug Midazolam is currently taught in some dental schools. While effective in the greater majority of adults, a small proportion of patients do not respond to this drug and may even appear to become more restless and to protest throughout the sedation period. In other words, one technique does not fit all (Pike 2003).

Further questions have also been raised about the safety of IV Midazolam sedation. Where applied to endoscopy a number of audits have suggested a mortality ration of 1 in 2000 (Leitch 2003). In medical specialities, intravenous (IV) Midazolam is gaining popularity as a conscious sedation agent in children. The advantages of IV Midazolam in children are: rapid onset of sedation, short duration of action and haemodynamic stability. The safety and tolerability profile of Midazolam in children has been described as "comparable or superior to that observed in adults". Intravenous Midazolam has not been readily accepted as a means of conscious sedation for the child dental patient in the UK and there is currently little evidence to support its use. Concerns are twofold: I) deeper levels of sedation than intended may be produced II) reaction of children to IV sedation may be unpredictable. Oral Midazolam is, however, gaining popularity and is proving to be both safe and effective. Midazolam may thus be an important additional option for dentistry in providing conscious sedation for children when DGA is considered the only other option (Averley 2004).

Up date on the use of Midazolam on children:-
The UK guidelines for the GDC and SIGN (Scottish Intercollegiate Guidelines Network) do not recommend the routine use of IV sedation below the age of 16. In Ireland, according to the January 2005 Draft Guidelines relating to the Administration of GA and Sedation in the Practice of Dentistry and on Resuscitation, IV sedation is not recommended for children, particularly under the age of 10 years. In summary,

recent reviews regarding the use of Midazolam for children has been questioned. It is felt to be appropriate only for a minority of children, and in a recent review, it was put forward that intravenous sedation for children below the age of 14 years should be carried out in a hospital facility (Hosey 2007).

Brief mention will be made on the latest sedation agents currently in use, namely Propofol and Sevofluorine. Propofol is an IV sedation and hypnotic agent introduced in the USA in 1998. While most commonly used for the introduction of GA, low dose Propofol has both anxiolytic and amnesic properties. Further research has indicated there is no oxygen desaturation or respiratory depression where Propofol is used for sedation purposes. Further research has indicated that the mean oxygen saturation of Midazolam was significantly lower in some patients. Again it has been shown that the time between injection and effect is only 3 to 4 minutes under Propofol compared to 12 to 13 minutes under Midazolam. As indicated previously, Sevofluorine is noted for the relative absence of cardiac arrhythmias when used for sedation (and GA). The main disadvantage of Propofol is that it has a much narrower margin of safety between sedation and anaesthesia than Midazolam, making it dangerous to use in untrained hands (Shearer 2004).

It might be apposite here to clarify some of the problems associated with sedation technique. Taking the guidelines issued by the Standing Dental Advisory Committee (2003) as the benchmark, the only currently recommended technique for inhalation sedation is a titrated dose of nitrous oxide with oxygen and it is absolutely essential to ensure that a hypoxic mixture cannot be administered. (Hypoxia, defined as pulse oximiter readings lower than 95% oxygen saturation). Even though there are few absolute contra-indications for conscious sedation, special care is required in the assessment and treatment of children and elderly patients. Conscious sedation for children must only be undertaken by teams which have adequate training and experience. Where intravenous sedation is concerned, the standard technique is the use of a single drug, for example the current use of benzodiazepine (SDAC 2003). With regard to midazolam, respiratory depression may occur if used as a sole agent in large doses. Where polypharmacy is concerned, children may require a combination of sedation, amnesia and analgesia. Possible complications here include post-operative drowsiness, blurred vision and abnormal behaviour. To conclude, adhering strictly to the definition of conscious sedation in out patient dentistry, it may be said that sedation is safer than general anaesthesia. However, if deep sedation is employed, the risks of airway obstruction, hypoventilation and hypoxia are greatly increased, with a higher associated mortality (Mikhael, Wray and Robb 2007).

A final note might be that the desired outcome in anxious patients is not sedation with associated problems of CNS depression, it is anxilysis (Leitch 2003).

The effect of the new National Health Service Contract (2006) for England and Wales on sedation is presented as follows:- (Clause 106) The Contractor shall provide *sedation* services (at the following times/during the following periods): (*to be completed as appropriate by the parties*). (Clause 107) The Contractor shall only provide *sedation services* under this Contract- (Clause 107.1) to a person to whom it is providing an entire *course of treatment*, during that *course of treatment;* or (Clause 107.2) as a *referral service,* and in this clause, "entire *course of treatment*" means a

course of treatment provided by only the Contractor. (Clause 108) The Contractor shall only provide *sedation services* to a patient in accordance with the recommendations contained in the report of the Standing Dental Advisory Committee entitled " Conscious Sedation in the Provision of Dental Care", insofar as those recommendations and guidelines are relevant to (Clause 108.1) the type of sedation being administered; and (Clause 108.2) the patient to whom the sedation is being administered (Standard General Dental Services Contract 2006).

In clinical terms, the GDP is obliged to enter into a contract with the Local Primary Care Trust (PCT) and to negotiate a UDA value (Unit of Dental Activity) considered appropriate to the type of sedation procedure being carried out. In this respect, there has to be a mutual agreement between the GDP and the PCT. This applies regardless of whether a dental practice is carrying out the occasional sedation or in the more likely event of a practice receiving referrals for sedation (Devonald 2007).

In summarising this chapter two definitions of conscious sedation are presented. The GDC distinguishes between conscious sedation and GA. Their definition of conscious sedation is defined as

"A technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation. The drugs and techniques used to provide conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely. The level of sedation must be such that the patient remains conscious, retains protective reflexes and is able to understand and to respond to verbal commands."

The American Academy of Paediatric Dentistry (AAPD) has also issued guidelines for conscious sedation and anaesthesia. The AAPD defines conscious sedation as

"A controlled pharmacologically induced minimally depressed state of consciousness that retains the patients ability to maintain a patent airway independently and continuously and respond appropriately to physical stimulation and/or verbal commands. The drugs, dosages and techniques used should carry a margin of safety which is unlikely to render the patient non-interactive and non-arousable."

A LIST OF REPORTS ON SEDATION PUBLISHED SINCE 1990

Title	Year	Source
General Anaesthesia, Sedation and Resuscitation in Dentistry	1990	Standing Dental Advisory Committee (SDAC)
Guidelines for Sedation by Non-Anaesthetists	1993	The Royal College of Surgeons of England
A Conscious Decision	2000	Department of Health
Standards in Conscious Sedation for Dentistry	2000	Report of an Independent Expert Working Group
Implementing and Ensuring Safe Sedation Practice for Healthcare Procedures in Adults	2001	The UK Academy of Medical Royal Colleges and Their Faculties
SIGN 58: Safe Sedation of Children Undergoing Diagnostic and Therapeutic Procedures	2002 (revised 2004)	Scottish Intercollegiate Guidelines Network
Conscious Sedation in the Provision of Dental Care	2003	Standing Dental Advisory Committee (SDAC)

(Scottish Dentist
Nov – Dec 2005)

With the above list of reports on sedation published 1990, it is appropriate to add the following publications:-

Dental Sedation Teachers Group (2006)	DSTG Report
Dental Sedation Teachers Group (2007)	DSTG Report

Need vs Demand

There has been a dramatic reduction in the number of dental GA's administered per annum in the UK since the 1950's. Data from the former Dental Estimates Board and the present Dental Practice Board show that over the last 40 years and in the past decade in particular, the number of dental treatments under GA have been continuing to fall in the GDS.

"Factors affecting the level of provision of GA may be due to changes in treatment pattern, greater awareness of GA risk, more stringent GA guidelines, change of role in the CDS and the introduction of capitation" (Macpherson et al 1996).

In addressing the problem of varying levels of GA use, more needs to be known about how the decision to provide GA is made. Poswillo (1990) considered that cultural factors and patient demand may have had an influence but produced no substantive evidence to support this. Recent research results have indicated that parents are not able to make an informed choice about GA, the dentist being in general the decision-maker. The decision to use GA may be influenced by non-clinical factors; these factors being identified as

i) the norms of the dentist

ii) overall attitudes towards GA

iii) how GA provision is structured locally

When a decision to administer a DGA has been taken, much has depended on the trust the parents have in their dental practitioner and the corresponding influence of same. As stated above factors of importance include availability of GA facilities in a certain area together with the mind sets of both the GDP and parents/carer. If good DGA facilities are readily available, a busy dental practice might favour a single GA rather than multiple local anaesthetics. It might also be said that a dental practice which has invested heavily in the necessary equipment required to carry out GAs to the required (Poswillo) standard, may wish to carry out a large number of GAs to cover the initial investment (Grant et al 1998).

While patients are unable to make clinical judgements about GA they are entitled to make informed choices between alternatives thus redeeming the imbalance in power between patient and professional (Hastings et al 1994).

From recent figures published by the DPB it can be observed, that following the Poswillo Report in 1990, there was an initial fall in the number of GA's administered. From 1994-1998 there was a considerable rise in the number of GA's provided; this rise being due to the increase in the number of dental anaesthetic clinics. This sharp increase in the volume of GA's provided at these specialist clinics did not seem to be compensated by a fall at other locations giving concerns that these specialist clinics may be providing a demand led rather than a needs led service (Grant 1998). This

created a dilemma of giving patients what they want and possibly providing unsuitable care because patients ask for it. It may be that patients want what the treatment will provide for them – that is they want an outcome. The dentist can suggest more appropriate alternatives that will also provide the outcome, thus supplying the patient with what they want in a clinically acceptable way. A clear distinction has to be made between demand for GA and need which can be measured against objective criteria. Demand in the absence of clinical need should not be considered unless there is sufficient reason to proceed with GA (Holt et al 1999). The CGAG Report in 1995 highlighted the need for positive action to re-educate patients and dentists away from the unnecessary provision of GA.

Poggo Anaesthetic Clinics

The rapid rise of the specialist anaesthetic clinics up to November 1998 throughout the UK gave rise to concerns that, following the introduction of such clinics, GA was being actively provided for dentists and their patients. These clinics, advertising in the National Dental Press, stated that *"adults and children are accepted on referral for any treatment required under GA both on NHS and private basis with all patients seen within day"* (CSAG 1995).

As a result of the Poswillo report some dental practices decided to cease all provision of GA for dental treatment. Others decided to continue in order to fill the void created when many nearby practices ceased to provide a DGA service. Many practices contracted with the "Poggo" Anaesthetic Group for the provision of general anaesthetic support services including the supply of dental anaesthetists and specialised equipment. As of June 1998 there were 47 such dental anaesthetic clinics in England, Scotland and Wales. There had been concerns that following the introduction of such clinics, the DGA use was being actively promoted to dentists and their patients, that the number of out patient DGAs may be increasing. In addition, serious concerns relating to the standards of such clinics were raised following an enquiry into an anaesthetic death and a second serious untoward incident at a DAC clinic in Nottinghamshire. Following an incident at a DAC practice in Derbyshire, Southern Derbyshire HA conducted a very detailed and thorough review of events related to the incident. The enquiry highlighted a number of key issues relating to DGA provision in general dental practice. These were stated below as follows:

- the need to remind those referring patients to a GA centre of their duty of vicarious liability
- the case for removing GA fees from the GDS and allocating them to HA's
- GA for dentistry should be concentrated in registered specialist centres, meeting certain minimum standards (premises, equipment, personnel and their training)
- the need to establish a regulatory body, with statutory powers over providers, to monitor standards relating to general anaesthesia in dentistry (HA or DPB were suggested)
- the need to clarify powers of HA's and the DPB, so they can act in the patients interest

- need for local clinical criteria for case selection, referral guidelines and standardised informed consent forms

Demand versus need is subject to wide variations within different regions of the UK and depends on the availability and accessibility of GA services. Where high levels of dental decay exist, GA is commonly used to expedite the treatment of young patients with tooth decay. The inequality in the availability of genera dental services may also influence the clinical decision making process. Hard pressed dentists may favour performing treatment under single GA rather than multiple LA's particularly if good dental GA facilities are readily available. There may have been a financial incentive for treatment with GA under the earlier capitation system where dentists received only a small weighted payment for a child with a high carious experience (Jones 1999). Referral for dental GA attracted a fee for item payments for all treatment carried out.

To conclude the prescription for GA may be based on factors other than need. Factors favouring extraction of teeth may be stated as follows:

i) ready availability and accessibility of GA services along with poorly designed fee scales

ii) where a child has acute dental pain, the parents may expect the problem to be resolved by the provision of a GA

iii) in the clinical domain where the dentist has no satisfactory clinical alternative in the management of the patient

iv) in the economic domain it may be more financially viable for a patient to be referred for GA

v) dental practices providing a GA service will require a certain minimum level of throughput to remain viable (Landes 1996).

With regard to need the criteria may be summarised as follows:

i) special needs patients for whom delivery of LA would be extremely difficult or impossible

ii) where LA has proved inadequate with or without sedation

iii) where the use of LA is contra-indicated by the presence of sepsis or where allergy has been proven

iv) the need for multiple extractions in young children where rampant caries is the norm

v) extractions in highly apprehensive children and adults including confirmed phobics

vi) surgical extraction of impacted teeth (CSAG 1995).

Finally the GDC Guidance to Dentists on Professional and Personal Conduct in November 1997 states:

"GA is a procedure which is never without risk. In assessing the needs of the individual patient due regard should be given to all aspects of behaviour management and anxiety control before deciding to proceed with a GA."

It may be useful at this point to consider briefly the current provision regarding administration of GA in dentistry. In keeping with the recommendations stated in the D of H Report (A Conscious Decision) namely all GA's administered after 31st December 2001 will be carried out within a hospital setting. Accessibility for GA in a hospital based service would appear to vary throughout the country, a few examples of this variability are stated briefly as follows:

i) In Greater Glasgow the Local Dental Committee (LDC) were concerned that no adequate provision for patient care was in place prior to cessation of GA in December 2000 (LDC Report). The LDC further stated that the referral system was inadequate and that sedation was by no means the panacea.

ii) In Teeside it appears that children may wait up to 6 months for vital dental treatment. Since Teeside has high levels of tooth decay, patients needing dental work carried out under GA and who must correspondingly be treated in hospital, face lengthy waiting times and delays for treatment (Dentistry 2002).

iii) The North Cheshire Hospital NHS Trust states that it cannot provide a GA service without extra resources and it would appear that the Health Authority has no extra money to provide this essential service (BDA News 2001).

iv) In an open letter, the Leeds Dental Institute dated February 2002 stated that as a result of DGA being only provided within the hospital setting, the number of referrals of children with dental disease has increased dramatically and this has in turn significantly increased the waiting time of new referrals. Further the Institute states that in spite of considerable effort over 18 months they have been unable to secure additional facilities and funding to expand the capacity.

v) the situation in Lincolnshire regarding GA and sedation will be considered in the study. However, it can be stated on anecdotal evidence that the average waiting time for GA for a child is now in the region of 6 months.

Consent

"By definition consent is a voluntary and continuing permission of a patient to receive a particular treatment. It must be based upon adequate knowledge of the purpose, nature, likely effects and risks of that treatment including the likelihood of its success and any alternative to it" (Standards in Conscious Sedation for dentistry/the Consent Process 2000).

It is the responsibility of the clinical dentist to ensure that patients and the parents or guardians of patients are truly informed of any treatment procedure. In other words, the clinician must make valid consent a reality. In this respect the consent process consists of all the treatment proposed, the risks involved and any alternative treatments and these must be in terms which the patient can understand. ("Maintaining Standards" 1999). The patients' understanding is an essential element in the validity of consent. Thus, to ensure that consent is valid, it must be both voluntary and informed. With regard to the administration of a GA, specific consent must be given in writing. Both the clinical dentist and anaesthetist have a professional responsibility for ensuring that consent is obtained before the GA (BDA News 1998). The clinical dentist retains the dual responsibility for obtaining consent for the dental treatment provided and also ensuring that specific consent is obtained for the anaesthetic. The GDC (Maintaining Standards 1999) states that

"if GA or sedation is to be given, all necessary information and explanation must be given by the anaesthetist/sedationist. In this situation written consent must be obtained."

There are both legal and ethical considerations to be taken into account when discussing consent for GA and sedation. It would appear that the law is moving away from a 'professionally centred' to a 'patient centred' approach. The issue of competency and hence authorisation regarding consent is particularly problematic in children and adults with mental impairment (Pace 2001). Comment will be made on the twelve key points in the consent form titled "The Law in England" (2001). Basically this document lays out the guidelines when health professionals need consent from patients and considers the problem of whether children can consent for themselves.

It may be noted that a 'competent' child can consent to treatment and a parent cannot override that consent, however a parent can consent if a 'competent' child refuses. (It would be the responsibility of the dentist and or anaesthetist to decide on the competence of the child.) Comment is made on the right person to seek consent and the amount of information a patient can reasonably expect before giving consent. It is noted that consent from the patient must be voluntary and not under any form of duress and it is particularly important to note that a signature on a consent form does not in itself prove that the consent is valid. Competent adult patients are entitled to refuse treatment even where it would clearly benefit a particular condition. Finally the document considers the question of the incompetent adult. Treatment may be carried out if it is in the best interests of the patient. Best interests may go wider than

best medical interests and may include factors such as the wishes and beliefs of the patient, their current wishes and spiritual and religious welfare. The conclusion to this document indicates that when a patient has never been competent, relations, carers and friends may be best placed to advise on the patient's needs and preferences. A major criticism of this document could be the lack of clear definition of the term 'competent' as this does leave scope for individual interpretation.

In a recent survey undertaken at University College London by Tahir et al (2001) it was decided to carry out an investigation to determine whether parents of children attending the out-patient GA sessions at the Eastman Dental Hospital understood the proposed treatment procedure and whether the consent was valid. The parents understanding of consent was based on their knowledge of the actual treatment procedure, the type of anaesthetic to be used and the number and type of teeth which would be extracted. Results indicated that 40% of written consent from parents was not valid. On the day of treatment 19% (n=70) still had not understood the procedure although there was a statistically significant increase in the proportion of valid consent on the day of actual treatment. Many of the subjects had no knowledge of the type of anaesthesia that would be used but were more aware of the number of teeth to be extracted. This survey could be said to have flagged up the importance of consent for treatment.

It also reaffirmed the responsibility of the clinician and anaesthetist to ensure that patients and their guardians were truly informed of the treatment procedure. Moreover it emphasised the point that it is the responsibility of the clinician to make informed consent a reality. In conclusion a lack of communication may occur because patients often do not understand what they are told. This may be partly because they are seen and receive information whilst they are under stress and in addition may not understand the dental or medical terminology.

In conclusion, it may be said that the consent process is a subject of some considerable size and may be open to misinterpretation by both professionals and patients.

Chapter XIV

The Practice of Dental General Anaesthesia in Europe and North America

Dental anaesthesia may be described as being deeply ingrained in United Kingdom culture. It has further been described as

"A childhood ordeal both terrifying but essential and an apparently inescapable fact of life. The question has always remained if it was a technique peculiar to the UK, how have other European countries managed without it? (Davies and Nind 1996).

A postal survey carried out by Davies and Nind in 1996 considered how children under 7 years of age requiring exodontias were treated in various European countries. 14 countries replied (nil from Belgium and Ireland) 12 countries commonly used topical anaesthesia sometimes as the sole agent. 14 countries commonly used LA for exodontias in children under 7 years. 5 countries reported using Nitrous Oxide sedation frequently while Finland commonly used IV sedation in children of this age. Further Finland was the only country to indicate 'chair dental GA' as a standard technique. It was noted that several countries used GA as a last resort and often only for patients with learning difficulties.

The information received from individual countries was as follows:

i) In the Netherlands GA is hardly provided in dentistry except in some special centres where care is provided for those with learning difficulties.

ii) In Denmark there are no national guidelines specifically designed for GA in dentistry. Only specialists in anaesthesia are allowed to give anaesthetics in dentistry be it inside or outside a hospital.

iii) In Austria there do not appear to be any guidelines from the Austrian Society of Anaesthesiology, Resuscitation and Intensive Care Medicine. However dental GA is available for children and adults with learning difficulties.

iv) In Greece dentists usually use LA and there is no record of GA administration in the dental office.

v) In Norway there are no guidelines for GA in dentistry. GA is only given under certain circumstances. In these cases intubation anaesthesia is administered at the University of Oslo or in departments of oral surgery at regional hospitals. Outside these specific centres no one is given a dental GA.

vi) In France there are no guidelines concerning anaesthesia in dentistry. The majority of dental treatment is carried out under LA. GA is always delivered by an anaesthetist in a private clinic or a public hospital where other surgical procedures take place.

The situation in Europe is somewhat in contrast to that or North America where according to the President of the Ontario Dental Society of Anaesthesiology the practice of dental GA and sedation continues to grow across Canada (Isen 2000). In

the province of Ontario, anaesthesia as it pertains to dentistry is practiced by dental anaesthesiologists, namely qualified dentists with advanced training and oral and maxillo-facial surgeons. On a recent visit to the USA the president of the BDA noted that in the States of Boston and Maryland not only was GA carried out in the dental office but the practice of operator/anaesthetist was still extant (Robson 1999). Regulations are in place requiring the presence of suitably trained and experienced nursing staff. The president was also questioned by two American maxillo-facial surgeons as to why UK dental practitioners are unable to deliver GA in clinical environments outside a hospital setting.

Several of the European countries commented that GA was usually only available as a last resort, and then only for those with learning difficulties. The point would seem to be that, in Europe, dental GA does not represent a necessary evil as the majority of young children in Europe do not have to endure it (Robson 1999). With regard to safety records in GA, the USA have an excellent safety record and as a consequence there is apparently not a significant loading on professional indemnity fees (Robson 1999).

Chapter XV

Complementary Therapies - Potential For Future Research

Recently the dental profession has become increasingly aware of the indivisibility of health overall and dental health. Most dental procedures are of necessity of a mechanical nature and it may be forgotten at times that the patients' mouth is in fact connected to a vital human being. Fischer (1998) stated that

"the profound inter-relationship between the mouth and the rest of the body has been recognised in the West for decades and by the Chinese for some 50 centuries."

This inter-relationship where it actually relates to pain is one of the reasons why acupuncture is used to some extent in many hospital pain clinics. For many anxious patients whose only way of allowing dental treatment is by way of sedation, non-pharmacological techniques for management of dental anxiety need to be developed. There seems to be a psychological chasm between medical logic and medieval Chinese theory. It is notable that some general medical practitioners and a few general dental practitioners include acupuncture in their armamentarium of pain and anxiety control and correspondingly some doctors and dentists now feel the need to encompass complementary therapies in their holistic practices. As far as acupuncture is concerned this is a comparatively simple technique, which can be readily practiced by both doctors and dentists, although it does need a specialised knowledge of both anatomy and physiology (Hayhoe 1998). The role of acupuncture as an adjunct in the management of an anxious patient has not been widely explored in dental settings, but has none the less been shown to be clinically effective in the treatment of anxiety (Tao 1993). The availability in primary dental care settings to help anxious patients may reduce the referral of such cases to hospital sedation units for routine dental care.

Recent research has concluded that acupuncture can supplement and be a valuable addition to the therapeutic armamentarium of the general dental practitioner, (but not to replace conventional treatment modalities). It's use as a sole analgesic for conventional treatment is questionable but it may be useful in the control of postoperative pain and in the management of facial pain, phobias and anxieties as well as temporal-mandibular joint dysfunction (Rosted 2000). With regard to the mechanism of how acupuncture works modern theories now suggest that seratonin and endorphin levels which are located and concentrated in the thalamus, increases during the process of acupuncture giving rise to a sensation of well-being and relaxation. In simple terms acupuncture operates on the observed principle that a stimulus applied to one site in the body can produce an effect at another site sometimes quite remote from the original stimulus (Thayer 2000). The principle advantage of using acupuncture for dental patients is that it is impossible to over sedate unlike some other techniques (Fischer 1998). To summarise, it may be said that acupuncture is a safe and a relatively side effect free method of treatment for anxiety and pain control, and merits careful study (Rosted et al 2005).

A further therapy, which may provide patients with adequate pain control and relation, is that of hypnosis. Hypnosis does not differ a great deal from normal consciousness, the main difference being that in hypnosis the imagination is greatly

enhanced and the power to criticise is reduced. On account of these factors, suggestions are accepted more readily and acted upon more easily (Graham 1998). Hypnosis may be defined as

"a state of intense concentration focusing and maximising involvement with one idea or sensory stimulus at one time" (Speigal H & Speigal D 1987).

Dental phobic patients can benefit from hypnosis as this therapy may result in changing the patient's interpretation of pain during or prior to the dental procedure. It has been noted previously that 50% of the UK public never or seldom attend for dental treatment giving rise to the notion that the public must have a distorted perception of dentists and dental treatment. This is a field in which hypnosis may have a part to play. Further, for dentists themselves, hypnosis may, on occasion help them to treat particularly stressed patients and so enable these patients to manage their stress (Graham 1998). As with acupuncture there are professional societies who offer fully authenticated courses – these courses and workshops being open to professionally qualified persons only.

Considering the various complementary therapies which may assist in pain and anxiety control, it should be borne in mind that the word holistic, a word frequently misused, does mean that the body should be looked at in a multi-dimensional way bearing in mind that each individual part is inextricably linked to all the others. When a holistic philosophy is adopted the means become available to reverse disease before symptoms become obvious. In other words *"health is not merely the absence of disease but a state of complete physical, mental and social well being"* (WHO 1948).

The complementary or alternative therapies, which have a place in dealing with the anxious patient, include not only acupuncture and hypnosis but, such modalities as homeopathy, chiropractic, applied kinesiology and holistic practice some of which may be available in specialist practices.

Conclusion

Complementary or alternative therapies are no different from any other therapy that a dentist may use. It is important that dentists are appropriately trained in the particular area of treatment they choose to provide. However, certain complementary therapies may have little significant support and so dental practitioners in these areas may be more vulnerable to complaint. GDPs wishing to specialise in the field of complementary therapies should therefore seek to become members of the appropriately recognised societies. Areas of concern should also be discussed with the appropriate protection society.

An Overview of the County of Lincolnshire

Lincolnshire has always been renowned as a premier agricultural county. It lies to the east of the main north/south routes and has the largest stretch of coastline in Eastern England. A county of contrasts, the rich fertile fenland in the south is well known for the production of tulip bulbs and soft fruit. The second largest county in England, Lincolnshire covers 2200 square miles with a population of approximately 580,000 and is one of the most sparsely populated counties in the UK. Local land changes in 1974 saw part of North Lincolnshire hived off to form part of the new county of Humberside. As stated above, the county's major industry is agriculture and some parts of the county possess some of the most productive farmland in the world. The county itself is divided into 7 districts of which one district comprises the cathedral city of Lincoln which is the administrative capital of the county (population 84,000) (Lincolnshire County Council 1991).

Dental Background

Lincolnshire is a county with large rural areas and a moderate number of scattered dental practices. Lincolnshire dentists currently have the fourth largest number of patients per practice on average compared to the rest of England and Wales – approximately 2935 patients per NHS dentist – the average number of patients for England and Wales being approximately 1832 patients per practice (BDJ 2001). Dentists in Lincolnshire on average carry out more basic treatment and less of the more advanced treatments such as endodontics and periodontal treatment than any other dentist in England and Wales. It is possible that the high volume of patient numbers influence this aspect of dental practice in the county.

With regard to the administration of DGA in Trent Region (which encompasses Nottinghamshire, Derbyshire, Lincolnshire, Leicestershire) the following action has been recommended to local health authorities, namely-

- after explanation of the proposed changes, inform their Local Dental Committee (LDC) and local DGA providers of their new policies and procedures
- remind both referring dentists and providers of their responsibilities and vicarious liability
- review, in conjunction with their LDC, the local criteria for inclusion of DGA practices in any locally prepared lists of providers, together with arrangements for the updating and distribution of such lists at regular intervals
- as a minimum, inspect annually all DGA practices and clinics-
- inspection team to comprise a dentist (normally the HA's General Dental Practice Adviser) and, preferably, a consultant paediatric anaesthetist with dental experience (as >80% of administrations are to children) or a consultant anaesthetist with paediatric or dental experience
  Annual inspections should include checks of –
- standard of premises and equipment (and working status of equipment)

- patient information leaflets and consent forms (which should include a statement that parents/patients have been informed of the possible consequences of GA and that alternative methods of anaesthesia/sedation have been discussed and considered, in order that informed consent is to be confirmed)
- practice/clinic "theatre book" – to ensure a separate written record that includes patients name, age, type of anaesthetic administered and dental treatment provided (this will assist additional quarterly monitoring) – this will be additional to a full record being made in the patient's notes
- the practice/clinic "unusual incidents log" – which could be combined with the "theatre book" (this will assist auditing)
- written records of staff on duty on each session (even for a single case) – to include names, job function, date and signature (to cross check against Poswillo/GDC guidance)
- written records of resuscitation/advanced life support training(for children and adults) provided by a recognised trainer undertaken by the **full** anaesthetic team, practising together – to include names of those participating, job function in the team, date and signatures (to cross check against Poswillo/GDC guidance and against duty logs)
- written records of continuing dental education/post-qualification study undertaken by all members of the dental team

Quarterly –

- analyse the latest Dental Practice Board (DPB) GDS data on GA and sedation to –
- monitor rolling trends and initiate appropriate local action
- identify low volume providers (average <25 cases per quarter, <100 cases per year)
- cross check accuracy with practice and against practice written records
- take up outstanding discrepancies with DPB
- confirm that the practice was using the services of an anaesthetist whose name was entered in the current GMC specialist list or the Tripartite NCA List and who was undertaking regular continuing medical education – with those practices who are not being reported to the GDC
- check the age of the anaesthetist – anaesthetists should normally be under 65, with those over 65 only being employed on locum contracts of less than one year while the practice/clinic makes alternative arrangements
- prepare brief written commentary for each provider on the action taken
- copy comments to HA (within 2 months of data being received)
- counsel low volume providers (<25 cases per quarter, <100 cases per annum) to cease provision, facilitating their switch (and that of dentist who refer to them) to appropriate alternative providers
- agree local clinical guidelines and referral protocols (covering case selection, referral protocols, practice procedures, consent etc) for use by **all** referring dentists and by all providers ensure that agreed guidelines are audited regularly
- establish (and encourage all referrers to use) provision in specialist centres (which may be in a primary care setting initially, but should be in a hospital setting within 5 years (using HA funding, Section 56, Personal Dental

Services etc) which meet defined standards and have facilities for case selection and patient assessment prior to service delivery

- publish regularly an up-to-date local list of practices/clinics that are regularly inspected and found to meet current local criteria for provision of DGA
- request the Dental Practice Board to arrange an inspection by the Regional Dental Officer should the premises or equipment in any GDS practice be found to be unsatisfactory
- report any practice/clinic with unsafe premises or equipment to the Health & Safety Executive
- make it known that repeated unsatisfactory performance by any provider dentist (as identified during quarterly or annual inspections) will be reported to the GDC (three consecutive adverse quarterly reports, with no evidence of the practice either striving to improve performance or responding to encouragement to cease provision) – as will practices which do not co-operate with this improved monitoring
- report all unusual events to the Regional Office and serious untoward incidents also to the Dental Services Branch, both of whom should publish annual numerical summaries
- explore the provision of factual educational information to the public highlighting the level of risk attached to all general anaesthetics and to empower parents and patients to ask about alternative methods of treatment delivery
- the above policies should be incorporated into all HA Primary Dental Care Strategies at the earliest opportunity

(Trent Dental Purchasing Group 1998)

Regarding performance indicators current values relating to the DMF rate for North and South Lincolnshire are indicated below. This table relates to figures published before the boundary changes in 2000-02.

Current Values	North Lincs	South Lincs
DMF	0.78	1.03
% decay free	76%	68%
% receiving fluoridated water	76%	26%

Primary Dental Care Strategy in Lincolnshire 1999-2003

With regard to access to dental services it was noted that registration levels in the GDS had fallen following the change in the registration period from 2 years to 15 months on the 31st December 1997. In Lincolnshire the dental workforce profile is older than the average for England. 58% of GDPs are over 40 years old compared to 48% in England (on average) and only 9% are under 30 years old compared to 15% for the rest of England.

In the last quarter (April-June 1999) in Lincolnshire 2752 people contacted the dental help line with difficulties on locating a dentist. This compared to 1469 people in the same quarter in 1998.

In 1999 there were 140 general dental practitioners in 70 practices with an average list size of 2846. This compared to an average of 1339 patients per practice in the rest of England.

30% of GDPs in the county have 3000 or more patients compared to 8% of GDPs for the rest of England. Only 23% of GDPs have less than 1000 patients compared to 47% of GDPs for the rest of England.

With regard to fluoridation, 40% of water supplies in Lincolnshire have been so treated to a level of 1 part per million. Lincolnshire Health Authority policy is to extend the present fluoridation scheme to cover the remainder of the county with the county town of Boston as the first priority. It is recognised that water fluoridation has the potential to not only improve dental health, but also to address access and workforce issues in the longer term by reducing the need for dental treatment. There is evidence of significantly better dental health in children in those parts of the county which are in receipt of fluoridated water (Bayes & Thomas 1996).

As Lincolnshire is an isolated rural county, the recruitment of dentists is proving difficult particularly in the southern part of the county, this at a time of a national shortage of dentists wishing to work in the NHS.

In the period 2003-2004 health in Lincolnshire underwent a further reorganisation with the county divided into east and west regions - each entity coming under the authority of its own Primary Care Trust (PCT).

Chapter XVII

Recommendations

From the results of the surveys carried out for this thesis, the following recommendations and the future provision of dental GA and sedation services are presented.

- Facilities to accommodate the smaller numbers of patients still requiring GA services should be set up in appropriate premises. If hospital accommodation is not feasible the GA access centres staffed and equipped in line with the GDC Guidelines (1998) may be a credible alternative.

- Referral centres for sedation must be set up in various parts of the county in order to avoid patients having to travel any great distance to obtain such treatment.

- There is a need to centralise sedation services and to train and support a limited number of dentists and staff who could treat significant numbers of such patients.

- Poswillo monies previously available for improving GA facilities should be made available for the training of both GDPs and staff who wish to practice sedation in their surgeries or health centres. Resources should also be available to facilitate the updating of knowledge relating to safe emergency procedures.

- To maintain the decline in the DMF rate, oral health promotion and caries preventive programmes must be maintained and re-emphasised throughout the region as well as the continuing promotion of water fluoridation.

- Make recommendations to UK dental schools and regional deaneries to ensure that undergraduate dentists receive the necessary education and training to become proficient on sedation techniques, and have some general knowledge on the application of general anaesthesia as it relates to dentistry.

Chapter XVIII

Conclusions

Dental GA provision, particularly the referral process, has been in a state of rapid transition since November 1998. The General Dental Council in its Guidance (1998) placed specific responsibilities on dentists at the referral stage, on those dentists running GA centres and where informed consent required an understanding of the alternatives and risks. Much of the discussion and research in this area of dentistry has focussed on clinical decision making from the referral process itself. This piece of research has been undertaken to ascertain whether it is possible to audit the referral process not only from the dentist's point of view as referrer or receiver of cases, but more importantly from the patients/parents perspective. As there has been very little published research on the choice of GA as a means of pain and anxiety management, this research has included the actual views of referring dentists and views of patients/parents as well as dentists working at referral centres. A questionnaire was developed and forwarded to all dentists in Lincolnshire to ascertain their views on the GDC Guidelines and on their referral routines. A parallel audit of parents/patients perception of the GDC Guidelines was developed particularly with regard to the availability of GA, and their experiences of the referral process before and after the GA assessment. The results emerging from the various elements of this audit were:-

In an area of relatively low use of dental GA (Lincolnshire) the views and referral patterns of GDP's changed very little following the GDC Guidelines indicating that changes were already being made before November 1998. The results also indicated that the referral procedures of referring dentists did not fully reflect the GDC Guidelines. In contrast the results from the GA centres indicated that the requirement to explain alternatives and risks were complied with. This indicates that there is a case for not duplicating the formal consent procedures but a filtering process is necessary if there is to be a move away from the regular use of general anaesthesia. The survey results indicated that almost without exception those referred for GA did actually receive it.

Further results of the survey indicated that a quarter of those referred to a GA centre had received GA for extractions in the past and many would find it difficult if GA were not available in the future. This indicates a strong family/cultural influence on the demand for GA and in most cases patient preference was the principle reason for the choice of GA. The results also indicated that the referring practitioner was a major influence on the choice of GA for some patients. In these circumstances it may be difficult for GDPs to persuade such patients to accept an alternative even in the lower volume use areas such as Lincolnshire. This is an area where need and demand are difficult to separate. Clinical need should include psychological need which in turn become expressed needs. Overcoming a cycle of repeat GA's within and between family members is a habit, which may be difficult to break. The ready availability of GA in the past has created a situation of supplier induced demand which will not disappear quickly in spite of the new regulations. Faced with the option of not having extractions under GA many respondents might not contemplate an alternative.

It would appear that a further state of transition is taking place so far as a significant section of the public is concerned. Managing this residual demand for GA is a challenge for the profession and the Health Authorities who are charged with monitoring standards during the next few years. The views of patients/parents and the profession expressed in this survey have emphasised that a small residual need for GA exists that will be difficult to provide if future arrangements are not carefully planned and funded. This underlines the point that considerable fiscal resources will be required to set up specialist units within the hospital service to provide a GA service for dental patients. While it is true that many former GA patients may be treated successfully under sedation, there will always be a minority of patients who will require GA and these patients must be treated somewhere.

As the changes made by the GDC in 1998 make it increasingly difficult to offer a GA service in general dental practice (after December 2001 impossible) this will inevitably lead to hospital-based only provision. While this may appear to be the gold standard or benchmark for the future provision of dental GA, it should be borne in mind that patients can still die in hospital and it is plain that a hospital only provision will lead to ever lengthening waiting lists. It would have been more sensible to have phased out GA in the GDS over a specific period of time (or set time frame) to allow for an adequate hospital-based service to develop in a measured manner (Willings 2000). It should be noted that, at the present time hospital departments have no contractual obligation to provide anaesthesia for the GDS (Rucklidge 2000). In addition hospital-based GA services will always be more expensive to implement and it is possible that the transfer of all dental GA cases to the hospital environment could affect other services by the reallocation of resources (Patel 2000). The GDC Guidelines of 1998 Section 4-13 para 111 indicates that

"providers of dental GA must have protocols that include immediate transfer of a patient to a critical care facility in the event of an emergency"

As this would appear to mean that an ICU bed must be left for the possibility of an emergency dental GA patient, it is hard to imagine any anaesthetic department director agreeing to such a request. It would also appear that at least some of the deaths in the dental chair which are spotlighted in the media seem to have some element of negligence or malpractice associated with them which could be said to highlight problems with policing rather than technique. With regard to those patients who still require GA (and this applied mainly to children) it should be noted that children in areas of the country without fluoridated water still develop dental caries and a significant number of these children would be unable to cooperate with local anaesthetic or sedation techniques.

While GA services have declined, there has not been a corresponding rise in the provision of sedation nor a rise in the number of children attending hospital for GA subsequent to the Guidelines of 1998. This may be interpreted as meaning that the previous numbers of paediatric anaesthetics were not solely necessity clinically driven. It could mean that a need was no longer being met due to the difficulty in finding hospital facilities that provide a conservative and exodontia treatment for children under GA. It is also possible that dentists may be carrying out more conservative treatment under local anaesthesia rather than extracting teeth. A further theory could be that dental decay is being "watched" in children until decay is

sufficiently advanced to merit extraction. (supervised neglect). It is also recognised that most hospital-based DGA's provide an extraction only service. There is no evidence that dental anaesthetists themselves were dangerous as most recent deaths relating to dental GA has occurred under the care of medically qualified career anaesthetists and the GDC Guidance of 1998 was simply a way of distancing the GDC and the dental profession from dental GA's and any problems that might occur, thus putting the onus on the medical establishment (Whittle 2001).

Research is still needed to find out how patients who may have been treated with GA prior to November 1998 are being managed. It would appear that much greater reliance is being placed on LA with patients being treated more conservatively. GDPs may be carrying out more pulp treatments or RCT, while it is also possible that patients are receiving more antibiotics giving rise to the question whether prescribing patterns have changed following the guidelines (BDJ 2000).

A further point relates to the fact that sedation is not a dental speciality. All other specialities are forms of dental treatment in themselves whereas conscious sedation is a way of delivering dental treatment in the same way as GA assists the delivery of surgical treatment (Pike 2001). If patients are referred for sedation to a clinical dentist (whose speciality this is) it is the responsibility of that dentist to provide sedation to the highest possible standard. As there is no speciality list for sedationists, anxious patients who are referred for dental treatment under conscious sedation, are denied the reassurance of seeing a practitioners name on a specialist list. If a specialist in sedation were created it would encourage training pathways and subsequent qualifications and would give a boost in confidence to both patients and referring practitioners. It would be bizarre in the extreme if consultant anaesthetists were not on any form of specialist list.

Outlook for the Future - Immediate Goals

i) Accept the culture change – that is encourage a move to other methods of patient management namely local anaesthetic or sedation techniques and thus place less reliance on GA.

ii) Ensure that a knowledge and experience of GA is maintained in dental education (thus allowing dentists to make appropriate decisions).

iii) To raise the profile of sedation techniques in undergraduate education so that every dental graduate is proficient in simple safe techniques.

iv) Ensure that when sedation is used the crucial issue of case selection is highlighted in order that the use of sedation without good clinical justification does not escalate out of control.

v) There needs to be more explicit criteria for justifying GA and a paradigm shift in the cultural acceptance of GA. There must also be a strengthening of the evidence base for conscious sedation and psychologically based options (Strunin 1999).

Finally, the present attitude among both referring dentists and those accepting referrals would appear to be (certainly in some cases) that all extractions may be carried out with local anaesthesia plus or minus sedation and that to administer a GA is now a mortal sin. The concept that sedation is the panacea for all patients is not realistic in areas of the country where high levels of dental decay still exist. Multiple extractions in children can be extremely traumatic and the inappropriate substitution of sedation in place of GA may well produce a generation of dental phobics.

If sedation in dentistry is to be successful, it may be that suitably qualified specialists in the subject may be necessary. These specialists may not be easy to acquire. In an editorial review of the topic Wraith (2001) posed the following questions-

- Should there be a proper training route for sedation?
- Should there be a registerable qualification?
- Should there be a specialist in anxiety and pain control?
- Should there be a register of Sedationists?

It is not within the scope of this thesis to attempt to answer these questions, but they do provide food for thought regarding the future of sedation in dentistry.

Chapter XX

SUMMARY

GA RESEARCH HEADLINES

1. Number of dentists using GA (direct/indirect) did change markedly after the guidelines.

4. The reasons given for reduction in referral are the difficulties of explaining risk and reduction in need. The numbers are low but relatively low because relatively few have actually changed.

5. Patient preference as the main influence on the decision did drop markedly but still remained at 25 – 33% of all cases.

6. Only 10% have changed **markedly** since the guidelines were issued.

8. Relevant factors were anxiety and age of the patient as a major factor on case selection other than the dental treatment requirement. The main reason quoted for reducing the GA in the future was to remove all doubtful teeth followed by prevention and offering alternatives but these two items were significantly less.

9. The 3 risks of GA. There was a good level of awareness of risks and notably mortality.

10. Only 80% said that they explained the risk to patients but probably this was an error caused by those who did not refer.

12. Fear and anxiety were the main reasons quoted by patients for wanting GA.

14. A standardised referral letter was not universal.

15 17 – 27% carried out sedation but very small numbers were treated by each dentist. The majority of GDPs used IV sedation with a small number using RA. 40% referred for sedation to a very wide selection of places in Lincolnshire, South Humber and beyond. There appears to be a need to centralise sedation services and train and support a limited number of dentists wou could treat significant numbers of such patients.

21. There was some support for resources to be made available to improve sedation services. However, on account of the relatively low numbers treated supporting too many dentists would not improve skill levels.

23. The views on the GDC guidelines were very varied. A substantial number were supportive but a larger number in Lincolnshire thought the guidelines represented an overkill. This group emphasised the need for better access for

GA for the small, but significant, number of those who still required it. The shortfalls in the services available were highlighted in many responses and emphasis was made regarding those patients currently being denied a service under the present circumstances.

24. The majority of responders thought that GA ought to be in hospital but a sizeable minority considered GA access centres – staffed and equipped in line with the GDC guidelines to be a credible alternative.

The numbers indicated above correlate with the results of the referral questionnaire sent out to all referring GDPs and Community Dental Officers in June 1999.

TABLE 4

A SUMMARY OF MAJOR REPORTS ON GENERAL ANAESTHESIA IN DENTISTRY 1967 – 2000

Report	Year of Publication
Dental Anaesthesia, Central Health Services Council, Standing Medical and Dental Advisory Committee	1967
Wylie, Report of the Working Party of training in Dental Anaesthesia	1978
Seward, Report of the Inter-Faculty Working Party on the Implementation of the Wylie Report	1980
Spence, Report of Joint Working Party on Anaesthesia in General Dental Practice	1981
Poswillo, General Anaesthesia, Sedation and Resuscitation in Dentistry, Report of an Expert Working Party	1990
Dental General Anaesthesia, Clinical Standards Advisory Group	1995
GA for Dentistry in Trent 1990-1998 A draft document published by the Purchasing Authority Chief Executive for Trent Region	1998
Maintaining Standards, General Dental Council	1998
Standards and Guidelines for General Anaesthesia in Dentistry, The Royal College of Anaesthetists	1999
Prescription of Halothane, Chief Dental Officer (England) for the Committee on Safety of Medicines (CSM)	2000
A Conscious Decision, General Anaesthesia and Sedation in primary dental care, Department of Health	2000
New Regulations for Dentists Providing GA in General Dental Practice	2000 (Dec)

Landes, 2002

TABLE 5

Number of General Anaesthetics Carried Out in Trent Region With Particular Reference to Lincolnshire

Year	Trent	Lincolnshire
1990 No of GDP Practices	31,077	6,117 55
1992	30,819	5,816 55
1993	24,987	4,383 43
1994	23,368	4,118 31
1995	24,844	3,979 27
1996	26,684	4,151 25
1997	26,106	3,608 27
1998	21,566	2,800 22
1999	13,636	1,009 9
2000	2,109	101 Figure unavailable
2001	1,674	Figure unavailable

Trent Regional Health Authority

TABLE 6

Number of Episodes of Care of General Anaesthesia within the CDS from 1980-2002, England

Year	0 – 4	5 – 15	Handicapped Adults	Total
1980	6,716	149,321	616	156,653
1981	6,705	134,919	868	142,492
1982	7,377	119,424	1,100	127,901
1983	7,937	102,449	1,282	111,668
1984	8,564	91,319	1,913	101,796
1985	8,744	85,142	1,982	95,868
1986/87	8,447	78,089	2,256	88,792
1987/88	8,622	72,439	2,691	83,752
1988/89	8,901	67,225	2,754	78,880
1989/90	9,440	64,441	3,276	77,157

Year	0 – 4	5 – 15	16 –64	65 +	Total
1991	10,343	50,771	3,243	81	64,438
1992	14,171	66,596	4,718	118	85,603
1993	15,467	71,540	5,632	157	92,796
1994	16,182	74,116	6,347	106	96,751
1995	16,037	77,239	7,366	154	100,796
1996	15,631	74,760	8,119	195	98,435
1997	13,383	72,258	8,097	209	93,947
1998	11,809	67,178	7,456	173	86,616
1999	9,815	54,331	6,570	242	70,958
2000					52,481
2001/02					39,796

Source Department of Health and Social Security, England

TABLE 7

(i) **Figures for Sedation England and Wales**

General Dental Services

1994/95	15,614
1995/96	114,614
1996/97	128,286
1997/98	148,568
1998/99	177,918
1999/00	228,466
2000/01	230,802
2001/02	268,215

Source Dental Practice Board

(ii) **Figures for Sedation within the Community Dental Service**

Year	0 – 4	5 – 15	16 – 64	65 +	Total
1991	294	3,909	809	41	5,053
1992	296	3,739	1,383	42	5,460
1993	189	3,826	1,502	49	5,566
1994	182	4,337	1,866	81	6,466
1995	232	4,735	2,710	90	7,767
1996	239	5,609	2,874	111	8,833
1997	304	6,004	3,931	150	10,389
1998	289	6,471	3,645	135	10,540
1999	359	8,131	4,236	178	12,904
2000					18,150
2001					18,247

Source DHS

In both tables, no figures are available prior to the dates indicated.

TABLE 8

Trends in the provision of general anaesthesia for dental treatment in the General Dental Service in Trent

Year Ending	30 September 1990		30 September 1991		31 March 1992		31 March 1993		31 March 1994	
HA	Number of DGAs	DGA DPs	Number of DGAs	DGA DPs	Number of DGAs	DGA DPs	Number of DGAs	DGA DPs	Number of DGAs	DGA DPs
Barnsley	2,551	27	2,451	28	2,510	28	1,831	24	1,560	17
Doncaster	3,856	28	3,247	28	3,508	29	3,268	25	3,502	25
Leicestershire	2,742	31	2,449	36	2,513	37	1,875	22	1,893	17
Lincolnshire	**6,117**	**55**	**5,063**	**55**	**5,516**	**53**	**4,383**	**43**	**4,118**	**33**
N. Derbyshire	1,587	19	3,205	26	3,498	27	3,166	25	2,685	23
N. Notts	3,532	32	3,030	27	3,129	24	2,703	20	2,391	12
Nottingham	1,902	30	1,299	34	1,605	30	581	21	486	14
Rotherham	3,421	26	3,152	25	3,470	23	3,311	19	2,634	19
Sheffield	2,730	47	2,341	44	2,231	42	1,674	33	1,358	24
S. Derbyshire	2,639	28	2,643	27	2,839	28	2,205	18	2,741	15
TRENT	**31,077**	**323**	**28,880**	**330**	**30,81**	**323**	**24,997**	**250**	**23,368**	**199**

Year Ending	31 March 1995		31 March 1996		31 March 1997		31 March 1998	
HA	Number of DGAs	DGA DPs	Number of DGAs	DGA DPs	Number of DGAs	DGA DP	Number of DGAs	DGA DP
Barnsley	1,642	10	1,808	11	2,212	13	709	9
Doncaster	3,625	19	4,197	19	4,151	17	4,370	16
Leicestershire	1,676	5	1,625	8	2,323	9	3,383	5
Lincolnshire	**3,979**	**29**	**5,630**	**25**	**3,608**	**27**	**2,800**	**20**
N. Derbyshire	2,393	20	2,177	15	2,532	20	1,588	11
N. Notts	2,032	8	2,038	8	2,343	11	1,567	9
Nottingham	230	8	245	7	233	11	3	2
Rotherham	2,511	12	2,411	14	2,222	14	1,793	13
Sheffield	919	14	954	8	1,132	14	1,549	8
S. Derbyshire	5,837	8	7,178	7	5,350	14	3,360	7
TRENT	**24,844**	**133**	**26,684**	**122**	**26,106**	**150**	**21,122**	**100**

KEY:

DGAs **number of dental general anaesthetics**

DGA DPs **number of dental practices providing dental treatment under GA**

Trent Regional Health Authority

TABLE 9

Figures for General Anaesthesia Administered by the Community Dental Service in Lincolnshire

	0 –4 years	5 – 15 years	16 – 64 years	65 + years	Total
1990 – 91	53	335	40	0	428
1991 – 92	69	513	78	7	667
1992 – 93	77	355	88	16	536
1993 –94	93	395	111	4	603
1994 – 95	73	468	103	14	658
1995 – 96	66	535	117	7	725
1996 – 97	71	585	128	6	790
1997 – 98	48	391	113	8	560
1998 – 99	25	369	83	3	380
1999 – 00	11	160	17	5	193
2001	31	153	21	6	211
2002	15	188	41	4	248

Data from K64 Returns (the procedural code used by the CDS to collate all data) Also data from Dental Services Manager, Lincolnshire

In 1997 the Pilgrim Hospital in Boston commenced a GA referral service. The figures above since 1997 may be seen as a compilation of CDS hospital activity in Gainsborough, Louth and Boston. This was in keeping with the GDC Guidance of 1998 when GA in the CDS clinics and most GDP surgeries ceased to be carried out.

Figures for Conscious Sedation and Relative Analgesia (RA) within the Hospital Service

1997 – 98	1			
1998 – 99	1			
1999 – 00	5			
2001 – 02	153	**Breakdown**		
		5 – 15	16 – 64	65+
		90	62	1

TABLE 10

Overall Figures for GA Administered by General Dental Services, England

Year	Number of GA's in GDS
1949	484,270
1950	1,033,640
1951	699,960
1952	1,402,530
1953	1,530,190
1954	1,787,860
1955	1,897,540
1956	2,010,180
1957	1,951,700
1958	1,932,370
1959	1,828,870
1960	1,707,180
1961	1,566,750
1962	1,501,610
1963	1,439,330
1964	1,387,380
1965	1,750,000
1966	1,222,540
1967	2,000,000
1968	1,285,620
1969	1,231,680
1970	1,225,690
1971	1,217,950
1972	1,226,520
1973	932,770
1974	1,138,320
1975	1,056,190
1976	956,170
1977	877,040
1978	792,660
1979	703,250
1980	666,640
1981	606,510
1982	540,930
1983	464,350
1984	408,960
1985	373,730
1986	334,600
1987	345,120
1988	309,330
1989	260,000

Year	Number of GA's in GDS
1990 – 91	226,000
1992 – 93	192,000
1994 – 95	138,691
1995 – 96	238,620
1996 – 97	249,804
1997 – 98	260,783
1998 – 99	200,027
1999 – 00	59,004
2000 – 01	45,510
2001 – 02	27,338

Figures CSAG and Dental Practice Board

The recent figures shown above indicate that since the publication of the GDC Guidelines in 1998 there has been a considerable drop in the annual rates of GA's administered. Although GA was not completely prescribed until the end of 2001, the numbers of GA carried out in general dental practice were very small and the figures mainly represent those GA's carried out in the hospital environment.

It may also be noted that there was a sharp fall in the numbers of GA's administered between 1976 and 1985. This may be due to more patients receiving treatment under GA together with a fall in the caries rate particularly among children. After the Poswillo Report in 1990 there was a rise in the number of GA's administered, and this may have been due to the sharp rise in the number of GA specialist clinics.

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Table 4 p101
A Summary of Major Reports on General Anaesthesia in Dentistry 1967-2000
Landes (2002)

Table 5 p102
Number of General Anaesthetics Carried Out in Trent Region With Particular Reference to Lincolnshire source Lincolnshire Health

Table 6 p103
Number of Episodes of Care of General Anaesthesia within the CDS from 1980-2002, England Source Department of Health and Social Security, England

Table 7 p104
(i) Figures for Sedation England and Wales General Dental Services source Dental Practice Board
(ii) Figures for Sedation within the Community Dental Service source DHS
In both tables, no figures are available prior to the dates indicated

Table 8 p105
Trends in the Provision of General Anaesthesia for Dental Treatment in the General Dental Service in Trent source Trent Region

Table 9 p106
Figures for General Anaesthesia Administered by the Community Dental Service in Lincolnshire
Figures for Conscious Sedation and Relative Analgesia (RA) within the Hospital Service source Lincolnshire Health

Table 10 p107-108
Overall Figures for GA Administered by General Dental Services, England
Mokhtar (1993)

Questionnaire for General Dental Practitioners Referring patients for General Anaesthesia and Sedation

Dear Colleague

As you are aware the General Dental Council (GDC) approved changes to its ethical guidelines in respect of resuscitation, sedation and general anaesthesia (GA) in November 1998.

I am currently undertaking an audit into patient *need* and *demand* for GA and would be most grateful for your co-operation in completing the following questionnaire.

All information gathered will be treated in strict confidence.

Thank you.

Iain M Middlemass MSc BDS TD

Please tick the relevant box where applicable

PERSONAL INFORMATION

a) Are you working as:

ī GDP ī CDO ī HDS

b) Did you qualify

ī Before 1973
ī 1974 – 1983
ī 1984 – 1999

c) In which area is your practice?

ī Northern Lincolnshire
ī Southern Lincolnshire
ī South Humberside

GENERAL ANAESTHESIA

1. Prior to GDC Guidelines did you provide

   Î GA
   Î Refer for GA
   Î Neither

2. Since the GDC Guidelines do you still provide

   Î GA
   Î Refer for GA
   Î Neither

3. (i) Have the numbers you treated or referred changed since the GDC Guidelines?

   Î Yes Î No

   (ii) If 'Yes' please indicate numbers per month

	Before Guidelines	After Guidelines
Treat	_____	_____
Refer	_____	_____

4. If you DO NOT refer patients for GA any longer please give reasons

_____
_____
_____
_____
_____

5. How much is your referral decision influenced by patient preference?

Before Guidelines	Î	None	Î	Little	Î	Considerably
After Guidelines	Î	None	Î	Little	Î	Considerably

6. As a result of the GDC Guidelines have your views on the need for GA referral changed?

Î Great deal Î Little Î Not at all

7. What factors do you consider relevant to case selection and suitability for GA?

Î Dental treatment requirement – please give examples:

_____
_____
_____

Î Medical history
Î Age
Î Anxiety level
Î Other (please specify)

_____
_____

8. What steps do you take to avoid repeat referrals?

_____
_____
_____

9. What do you consider to be the THREE major potential risks involved in GA?

_____
_____
_____

10. (i) Do you explain these potential risks to patients?

Î Yes Î No

(ii) What alternatives to GA do you offer?

Î LA
Î Sedation (IV/RA)
Î Other (please state) _____

_____

11. Do you have any other views or observations on this area of the Guidelines ie Risks and Alternatives?

1

_____
_____
_____
_____

12. What reasons do parents/patients give when requesting GA?

_____
_____
_____

2

13. Do you always undertake a full medical assessment of patients whom you refer for GA?

Î Yes Î No

14. Do you use a standardised referral letter?

2

Î Yes Î No

SEDATION

2

15. Do you carry out sedation in your practice?

Î Yes Î No

If 'No' go to Question 18

2

16. If Yes, how many per month?

Î children under 16
Î adults

17. Indicate which of the following types of sedation you use.

Î IV
Î Inhalation (Sevofluorane)
Î RA (N20/02)

18. Do you refer cases for sedation?

Î Yes Î No

19. (i) 'Yes' – How many per month?

Ī Children
Ī Adults

(ii) Where are they referred?

_____
_____
_____

20. What reasons would you give for referring patients for sedation?

_____
_____
_____

21. Would your practice provide sedation if resources were made available:

Ī Yes Ī No

22. If 'Yes' indicate the nature of these resources or the support you would require.

_____
_____
_____
_____

23. What are your personal views on the GDC Guidelines?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

24. Should GA for dentistry only take place in hospital?

Ī Yes Ī No

General comments:

Thank you very much for completing this questionnaire

Please return to:

Iain M Middlemass
Portland Dental Care
Portland Street
Lincoln

Questionnaire for General Dental Practitioners Carrying Out Clinical Procedures Under General Anaesthesia

Dear Colleague

As you are aware the General Dental Council (GDC) approved changes to its ethical guidelines in respe3ct of resuscitation, sedation and general anaesthesia (GA) in November 1998.

I am currently undertaking an audit into patient *need* and *demand* for GA and would be most grateful for your co-operation in completing the following questionnaire.

All information gathered will be treated in strict confidence.

Thank you.

Iain M Middlemass MSc BDS TD

Please tick the relevant box where applicable

PERSONAL INFORMATION

1. Were you satisfied that the referral letter followed the criteria laid down by the GDC Guidelines of November 1998 and that the reasons for GA were clear and concise (ie full justification for GA)?

   □ Yes
   □ No

2. Were you satisfied that a full medical and dental history had been undertaken by the referring dentist?

   □ Yes
   □ No

3. Did you establish that written consent had been obtained?

   □ Yes
   □ No

4. Do you keep a record of the assessment process?

- □ Yes
- □ No

5. Were alternative methods of treatment considered during the assessment process?

- □ Yes
- □ No

6. Did you give a clear explanation of the risks involved (and the possible alternatives to GA)?

- □ Yes
- □ No

7. What alternatives to GA were discussed with the patient?

- □ LA
- □ RA
- □ IV
- □ None

8. If GA was the selected method of treatment were you satisfied that GA was clinically necessary?

- □ Yes
- □ No

9. Were methods of pain and anxiety control stated?

- □ Yes
- □ No

10. Were doubtful teeth checked to avoid a repeat anaesthetic?

- □ Yes
- □ No

11. Did you think that the patient/parent was satisfied with the treatment plan?

- ☐ Yes
- ☐ No

12. General comments:

Thank you very much for completing this questionnaire

Please return to:

Iain M Middlemass
Portland Dental Care
Portland Street
Lincoln

Patient Pre-Assessment Questionnaire

Please tick the relevant box where applicable

1. Are you replying on your own behalf or on behalf of the child?

   □ Own
   □ Child

2. Have you/your child had a previous general anaesthetic?

   □ Yes
   □ No

3. If YES was it for tooth removal or operation in hospital?

   □ Tooth removal
   □ Hospital

4. Is it common practice in your family to have GA for tooth removal?

   □ Yes
   □ No

5. Have you/your child felt poorly after tooth removal under GA in the past?

   □ Yes
   □ No

6. Was the choice of GA?

   □ Your own/child
   □ That of the family dentist

7. Have you/your child been offered anything else instead of GA?

   □ Yes
   □ No

8. If YES what were you offered?

- □ Local anaesthetic
- □ Sedation

9. Would you/your child have treatment by local anaesthesia if GA was not available?

- □ Yes
- □ No

10. How important is having a general anaesthetic to you/your child?

- □ Very
- □ Quite
- □ Not at all

11. Have you received any advice regarding the possible risks associated with GA?

- □ Yes
- □ No

12. What advice was received with regard to GA?

- □ Checked medical history – post-op care
- □ No food or drink 6 hours before GA
- □ Risk of possible sickness and dizziness after GA
- □ Always slight risk with GA
- □ Informed what the procedure would be
- □ Possible risk from anaesthetic
- □ Asked if any health problems

14. Would having tooth removal be more difficult for you/your child if GA was no longer available?

- □ Yes
- □ No

General comments:

Patient Post Assessment Questionnaire

1. were the alternative methods of treatment and their relative risks explained in an understandable way?

   - □ Yes
   - □ No

2. What method of treatment was chosen?

   - □ LA
   - □ Sedation
   - □ GA
   - □ No response

3. Were you/your child happy with the method chosen?

   - □ Yes
   - □ No

4. Do you feel that you/your child views were taken into account in deciding the method of treatment?

   - □ Yes
   - □ No
   - □ None